ABANDONED OR RESERVE WATER SUPPLIES

METROPOLITAN DISTRICT COMMISSION SERVICE AREA

FEBRUARY 1980

Department of the Army
New England Division, Corps of Engineers
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This report identifies water supplies that had been abandoned or that have been placed in reserve with a yield of greater than 100 gallons per minute and located with the area supplied by the Metropolitan District Commission (MDC) in Eastern Massachusetts (Greater Boston Area). This includes all of the 44 communities fully or partially supplied by the MDC. There are a total of 46 abandoned or reserve water supplies representing a total yield of approximately 130.5 million gallons per day (mdgl). Twenty-five supplies representing a yield of approximately 33.5 mdg were determined unfeasible. Twenty-one supplies representing 97.0 were determined feasible.

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ABANDONED OR RESERVE WATER SUPPLIES METROPOLITAN DISTRICT COMMISSION SERVICE AREA

FOR
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS

IN COMPLIANCE WITH
CONTRACT DACW33-79-0093

BY
COFFIN & RICHARDSON, INC.
BOSTON, MASSACHUSETTS

TABLE OF MAP LOCATIONS

TABLE OF MAP LOCATIONS (CONT.)

INTRODUCTION

OBJECTIVES

The objectives of this study are as follows:

a. To identify water supplies that have been abandoned or that have been placed in reserve with a yield of greater than 100 gallons per minute (gpm) and located within the area supplied by the Metropolitan District Commission (MDC).

b. To collect basic data on and make site inspections of all of the identified supplies in order to compile a fact sheet on each supply.

c. To determine which, if any, of the identified supplies are potentially feasible to reactivate.

d. To determine to the extent available data permits, the methods of water treatment necessary to reactivate those supplies found to be potentially feasible.

e. To prepare order of magnitude estimates of the cost of reactivation for those supplies found to be potentially feasible.

f. To determine which, if any, of the supplies found to be potentially feasible are practical to reactivate based on estimated cost, environmental constraints, and downstream flow requirements.

STUDY AREA

The study area includes all of the 44 communities either fully or partially supplied by the Metropolitan District Commission. These communities are as follows:

Arlington	Marblehead	Southborough
Belmont	Marlborough	South Hadley Fire
Boston	Medford	District #1
Brookline	Melrose	Stoneham
Cambridge	Milton	Swampscott
Canton	Nahant	Wakefield
Chelsea	Needham	Waltham
Chicopee	Newton	Watertown
Clinton	Northborough	Wellesley
Everett	Norwood	Weston
Framingham	Peabody	Wilbraham
Leominster	Quincy	Winchester
Lexington	Revere	Winthrop
Lynnfield Water District	Saugus	Woburn
Malden	Somerville	Worcester

SUMMARY AND CONCLUSIONS

A total of 46 abandoned or reserve water supplies, representing a total yield of approximately 130.5 million gallons per day (mgd), were identified and studied to assess the feasibility of reactivation. Twenty-five supplies, representing a yield of approximately 33.5 mgd, were determined to be unfeasible. Twenty-one supplies, representing a yeild of approximately 97.0 mgd, were determined to be potentially feasible. The potentially feasible supplies were further assessed to determine the practicality of reactivating them. Nine supplies were found to be practical to reactivate. These supplies represent a yield of approximately 52.5 mgd and would cost an estimated $55,050,000 to reactivate. However, two of these supplies, representing a yield of approximately 13.0 mgd and costing an estimated $25,700,000 are located in the Connecticut River Watershed. Twelve supplies were found to be impractical to reactivate. These represent a yield of approximately 44.5 mgd and would cost an estimated $83,265,000 to reactivate. Table 1 provides a breakdown by watershed of yield and cost figures for supplies which were found to be either practical or impractical to reactivate. A complete summary of the information and conclusions contained in this report can be found in the section entitled "Data Martix".

TABLE 1

BREAKDOWN BY WATERSHED OF YIELD AND COST FIGURES FOR ABANDONED OR RESERVE WATER SUPPLIES

WHICH WERE FOUND TO BE EITHER PRACTICAL OR IMPRACTICAL TO RE/CTIVATE AS SHOWN IN THE MATRIX

	PRACTICAL SUPPLIES		IMPRACTICAL SUPPLIES	
Name, Location of Supply	Cost ($1000)	Yield (mgd)	Cost ($1000)	Yield (mgd)
CHARLES RIVER BASIN				
Dedham Ave, Needham	100	0.43		
Newton Water Works, Needham & Newton	7,800	8.00		
Charles River Wells, Waltham	3,300	2.50-3.00		
Rosemary Brook, Wellesley	2,250	2.00		
SUBTOTAL	13,450	12.93-13.43		
CONNECTICUT RIVER BASIN				
Chicopee River Canal, Chicopee	20,000	10.00		
Cooley Brook & Morton Bk Res, Chicopee	5,700	3.03		
Leaping Well Res., S. Hadley			700	0.28
SUBTOTAL	25,700	13.03	700	0.28
IPSWICH RIVER BASIN				
Pine St. & Johnson St. Wells, Peabody			1,530	1.20
SUBTOTAL			1,530	1.20
MERRIMACK RIVER BASIN				
Wekepeke Brook, Sterling			4,000	1.20
Farm Pond, Framingham			2,250	0.70
Millham Reservoir, Marlboro			7,250	2.20
Cold Harbor Brook Res, Shrewsbury			600	0.18
Lake Cochituate Wells, Framingham	3,100	3.00		
Upper Sudbury River, Southboro & Marlboro	11,800	21.90		
Lower Sudbury River, Framingham, Ashland & Hopkinton			60,800	34.50
SUBTOTAL	14,900	24.90	74,900	38.78
MYSTIC RIVER BASIN				
Great Meadows, Lexington			1,335	1.00
Spot Pond, Medford			660	0.22
SUBTOTAL			1,995	1.22
NEPONSET RIVER BASIN				
Springdale, Canton & Stoughton			1,430	0.70
Buckmaster Pond, Westwood	1,000	1.50		
Ellis Station, Norwood			2,710	2.50
SUBTOTAL	1,000	1.50	4,140	3.20
TOTAL	$ 55,050	52.36-52.86	$ 83,265	44.63

FACT SHEETS

An extensive literature search was employed to compile a listing of water supplies within the study area which had been abandoned or are now considered to be reserve supplies. For the purpose of this study an abandoned water supply is a supply which was once used as a public water supply but which cannot be used as such at this time for any reason. A reserve water supply is a supply which was once used as a public water supply which for some reason is not, or for reasons of quality, cannot be used as a public supply on a daily basis (normal service) at this time. Once a complete listing of supplies meeting these criteria was assembled, a fact sheet was developed for each supply.

The fact sheets for each supply consist of two or three pages. The first page of the fact sheet was compiled for every supply identified and contains basic descriptive and historical data. Included on this page is the name of the supply, the location, the community served, the type of supply, a brief description, the last reported or estimated yield, the year developed, the year removed from normal service, the water treatment prior to removal from normal service, the watershed in which the supply is located, the present ownership and use of the supply site, any reported water quality defects, the feasibility of reactivation, and the 1978 quantity of Metropolitan District Commission (MDC) supplied water used by the community or communities served by the supply.

The second page of the fact sheet was compiled only for those supplies which were found to be potentially feasible to reactivate. This page contains information on downstream users which would be impacted by the reactivation of the supply, known water rights affecting the use of the supply, major environmental impacts associated with reactivation, major pollution sources on the watershed which could adversely affect the supply, water quality parameters requiring treatment, the treatment required, the estimated cost of treatment, and an estimate of the total cost of reactivation.

The final page of the fact sheet was compiled for every supply and contains the most recent water chemical quality data available in the files of the Massachusetts Department of Environmental Quality Engineering (DEQE). Due to the long period of time over which the various supplies have been abandoned, the format and the extent of the analyses vary a great deal.

DATA COLLECTION

The basic data found on page 1 of the fact sheets was collected in a number of ways. Much of the data was collected during the literature search used to compile the list of supplies. Information which was not available in the literature was gathered through interviews with officials of the water supply agencies in the various communities in which the supplies are located as well as through interviews with MDC and DEQE engineering personnel. Interviews were also conducted with members of the Charles River Watershed Association and the Neponset Conservation Association.

In addition to information gathered through literature review and interviews, much basic data was attained by means of field inspections of the supply sites. Field inspections were also of great importance in assessing the feasbility of reactivation of individual supplies. Yield data was unavailable for several surface supplies and, in those cases, estimates of yield were made from curves found in the Third Progress Report of the Committee on Rainfall and Yield of Watersheds in New England in the Journal of the New England Water Works Association, Volume 59, September, 1945.

Information on the ownership and present use of supply sites was based on interviews with state and local officials and field inspections. Data on water quality defects was gathered both from the water quality analysis reports of the DEQE (the most recent of which appear as the last page of the fact sheets for each supply) and from reports published elsewhere in the literatu

FEASIBILITY CRITERIA

In accordance with the requirements of the contract, reactivation of an abandoned or reserve water supply was deemed to be unfeasible if one or more of the following five conditions occurred:

a. Reactivation of the supply would require extensive relocation or destruction of existing surface structures.

b. Reactivation of the supply could only be accomplished if desalination procedures were employed.

c. Reactivation of the supply would reduce the yield of other water supplies presently in use.

d. Leachate from a sanitary landfill or other solid waste disposal facility would be likely to enter the supply.

e. Other forms of water quality degradation have rendered the supply unfit for use as a public water supply.

EVALUATION OF POTENTIALLY FEASIBLE SUPPLIES

Those supplies for which reactivation was determined to be potentially feasible were evaluated in greater detail than those determined to be unfeasible. This evaluation is summarized by the second part of the fact sheets as described above in the section entitled "Fact Sheets".

Information on the communities downstream which would be impacted by the reactivation of a supply is confined to those communities whose water supplies or dilution water for sewage treatment plant discharges might be affected. The effect on recreational use or aesthetic values was not evaluated.

In considering the possible environmental impacts associated with the reactivation of supplies, the resulting reduction in flow in the downstream portion of the watershed was considered to be one of the most important aspects. Since many of the communities within the study area are connected to the MDC sewer system which empties into Boston Harbor, the use of local supplies would remove any water used for water supply purposes from the watershed. This would result in a reduction in flow downstream of the site of the water supply which would have impacts upon both the existing ecological conditions and the human usage of the watershed. Another important environmental consideration which is noted in the fact sheets is the effect of using water supplies which contain a high level of sodium. Because the public must be informed when the water in use contains in excess of 20 milligrams of sodium per liter of water, the supplies where this is likely to occur have been indicated.

Major pollution sources occurring on the watershed were determined on the basis of on-site inspections and interviews with state and local officials. This data on pollution sources is intended only as a superficial survey and is not meant to be considered a complete and exhaustive list.

The determination of the treatment required to reactivate the supplies was based on water quality data available and information found elsewhere in the literature as well as on on-site inspections. It should be noted that in the case of some of the abandoned supplies, the water quality data is quite old and that complete analyses based on present requirements could turn up additional water quality problems which may require more extensive treatment than that recommended in this report.

COST DETERMINATION

Treatment facility cost estimates were determined through the use of a cost curve which was developed from data on the actual construction costs of treatment facilities in the New England region. Cost figures include costs for special site work, contractor overhead and profit, engineering and contingencies, fiscal costs and administrative costs. All cost estimates represent the expected cost of facilities on about September 1, 1980. (The cost curve used is presented in Appendix B). In cases where activated carbon treatment was required, the cost as determined from the curve was multiplied by a factor of 1.3 to allow for an added 30 percent cost factor associated with activated carbon treatment.

In addition to the cost of treatment plants, the costs of any other facilities were considered. These other facilities include such items as new wells, reservoir cleanings, pumps, pumphouses and mains. The costs of these facilities were estimated on an item by item basis and the total cost of all the necessary items to reactivate a supply were then added to the cost of treatment facilities to get the total cost of reactivation.

The costs for the Millham Reservoir and Williams Lake in Marlborough were not determined in the manner described above. The firm of Metcalf & Eddy, Inc., of Boston, Massachusetts is presently studying the possibility of reactivating the Millham Reservoir and the capital cost presented in this report is their preliminary estimate. The cost of water per million gallons was

estimated based upon the capital cost estimate provided by Metcalf & Eddy, Inc. Since the facilities proposed by Metcalf & Eddy would utilize water flowing from Williams Lake to the Millham Reservoir, the cost figures represent a combination of the costs of reactivating the two supplies.

The cost associated with the Ellis Station Supply and Buckmaster Pond in Norwood are figures determined by the firm of Fay, Spofford & Thorndike, Inc., of Boston, Massachusetts. All cost figures except the cost of water per million gallons were taken from their report entitled, Norwood, Massachusetts, Report on Groundwater Supply Facilities, Ellis Avenue and Buckmaster Pond.

The method of estimating the costs of the Upper Sudbury River Supply and the Lower Sudbury River Supply are described in Appendix A.

The cost of water per million gallons was determined using an annual operation and maintenance cost of $170 per million gallons for standard treatment plants and $190 per million gallons for plants with activated carbon treatment. A rate of $77 per million gallons for operation and maintenance was used for the Dedham Avenue Supply in Needham which only required chlorination as treatment. In addition, an annual depreciation rate of 3 percent and an annual rate of interest on the capital cost of 6 percent were added to the operation and maintenance cost to arrive at the total cost of water per million gallons. With the exception of the Upper Sudbury River Supply, the Lower Sudbury

River Supply and the Dedham Avenue Supply all final costs per million gallons presented have been adjusted to reflect state funding of 50 percent of the cost of treatment facilities under Chapter 406 of the Acts of 1978.

LOCATION MAPS

Location maps were prepared using United States Geological Survey topographical maps. The name and location of each supply is indicated on the maps as is the name of the community which used the supply.

DATA MATRIX

When all of the necessary data had been gathered and the pertinent evaluations and cost estimates were completed, a matrix was developed summarizing the results. Contained in this matrix is the basic data found on the first page of the invididual fact sheets for each supply, as well as much of the data found on the second page of the fact sheets of those supplies which were found to be potentially feasible to reactivate.

In addition to the data from the fact sheets, the matrix also contains information concerning the practicality of reactivating those supplies which were found to be potentially feasible. As stated in the objectives and called for in the contract for this study, the practicality of reactivating any particular supply is based upon the estimated cost, the environmental constraints involved, and downstream flow requirements. The practicality of reactivation of each feasible supply is noted in the matrix and for those deemed impractical, the reason is identified.

An analysis of the economic practicality of each potentially feasible water supply was made by estimating the cost of water per million gallons. The method used is described in the section on cost determination. A cut-off point $480 per million gallons was chosen to separate the practical (below $480) from the impractical (above $480) supplies. The figure $480 was chosen because it is exactly twice the present rate charged for water by the MDC.

None of the water supplies examined were rejected as impractical due to environmental constraints or downstream flow requirements. The reason for this is that there was not enough detailed information available on any of the water supplies studied to allow an accurate assessment of the impact of reactivation on either environmental parameters or downstream flow requirements.

It should be kept in mind that the designation of a water supply as being practical for reactivation should only be interpreted to mean practical within the context of this study. Since this study is primarily concerned with gathering general information on a large number of water supplies rather than providing an in-depth analysis of an individual supply, it is entirely possible that a more detailed study of any of the supplies identified in this report as being practical could turn up information causing that supply to be rejected as impractical. The water supplies identified in this report as being practical should be considered only as being the best candidates for further study concerning possible reactivation.

FACT SHEETS

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Arlington Reservoir

Location: In east Lexington and west Arlington, south of Lowell Street.

Community Served: Arlington

Type of Supply: Surface

Description: Reservoir with a surface area of 31 acres, a drainage area of 2,700 acres and a storage capacity of 77 mg. Water drawn through a filter gallery.

Last Reported or Estimated Yield: .90 mgd.

Year Developed: 1872

Year Removed from Normal Service: 1899

Reason for Removal from Service: Poor water quality. Arlington joined the MDC.

Treatment Prior to Removal from Service: Water from Reservoir drawn through a filter gallery.

Watershed in which Supply is Located: Mill Brook-Lower Mystic Lake

Present Ownership and Use of Supply Site: Owned by the Town of Arlington and used for swimming.

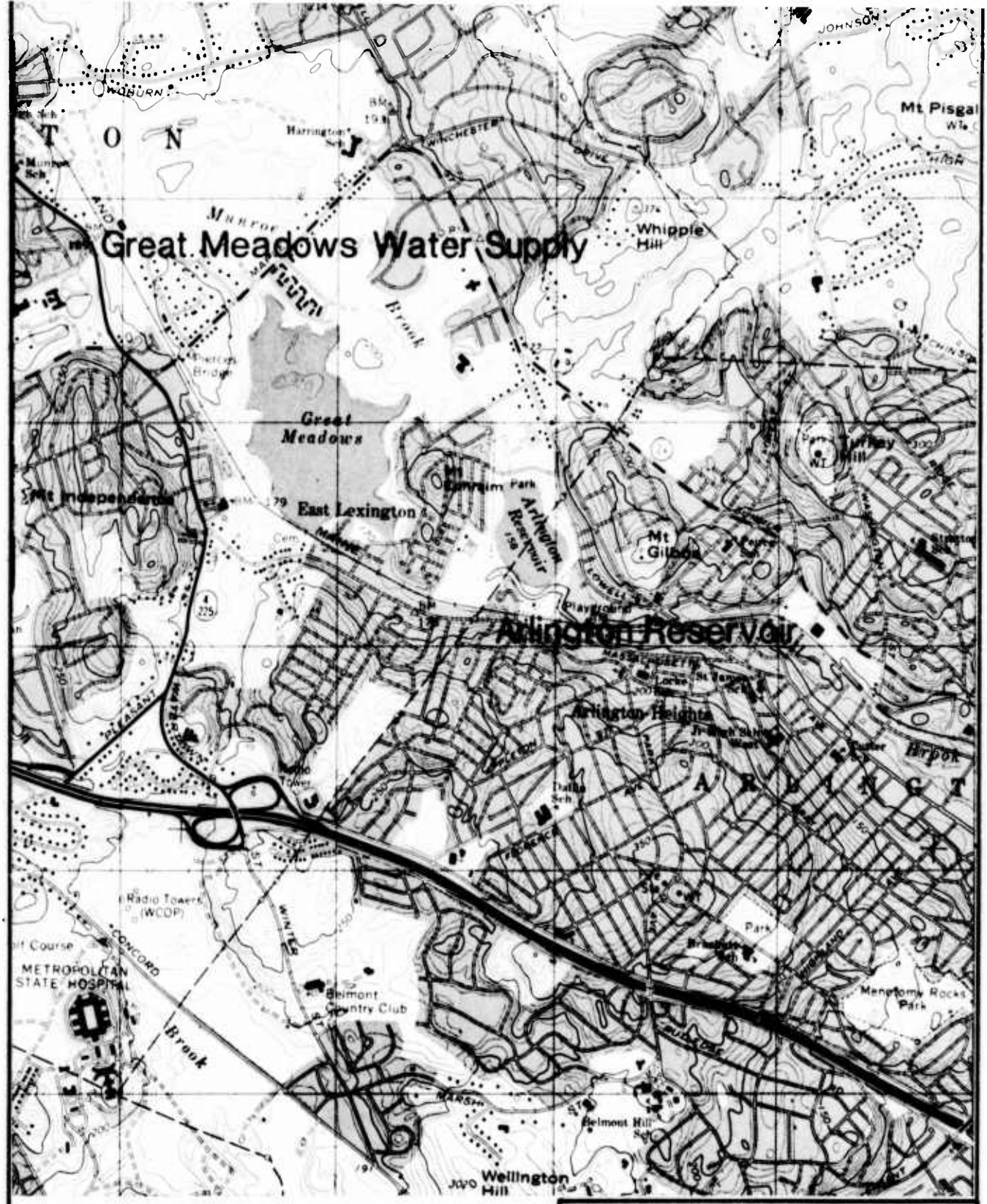
Reported Water Quality Defects: Taste

Feasibility of Reactivation: Unfeasible, a solid waste disposal site on Summer Street in Arlington drains into Reservoir.

1978 MDC Water Use by Community: 1795.03 mg. or 4.92 mgd.

Arlington Reservoir. Water supply for Arlington, Massachusetts. Average chemical analysis for 1899. Data from the Massachusetts State Board of Health Annual Report of 1899. Chemical values in parts per 100,000.

Number of Samples	6
Color	0.92
Residue on Evaporation	
Total	7.17
Loss on Ignition	3.10
Free Ammonia	.0046
Albuminoid Ammonia	
Total	.0512
Dissolved	.0327
Suspended	.0185
Chlorine	.56
Nitrogen as Nitrates	.0248
Nitrogen as Nitrites	.0003
Oxygen consumed	0.88
Hardness	2.3



Great Meadows and Arlington Reservoir Water Supply for Arlington, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Great Meadows

Location: In Lexington, south of Munroe Brook, southeast of Maple Street and north of the Boston and Maine Railroad tracks.

Community Served: Arlington

Type of Supply: Groundwater

Description: Tubular wells an average of 35 feet deep.

Last Reported or Estimated Yield: 1.00 mgd.

Year Developed: 1895

Year Removed from Normal Service: 1899

Reason for Removal from Service: Poor water quality, Arlington joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Mill Brook-Lower Mystic Lake

Present Ownership and Use of Supply Site: The site is a wetlands area owned by the Town of Arlington.

Reported Water Quality Defects: Color and iron.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 1795.03 mg or 4.92 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Great Meadows

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Could reduce the flow of the Mystic River, particularly during periods of low flow.

Pollution Sources on Watershed: Runoff from roads and residential developments.

Water Quality Parameters Requiring Treatment: Color and iron.

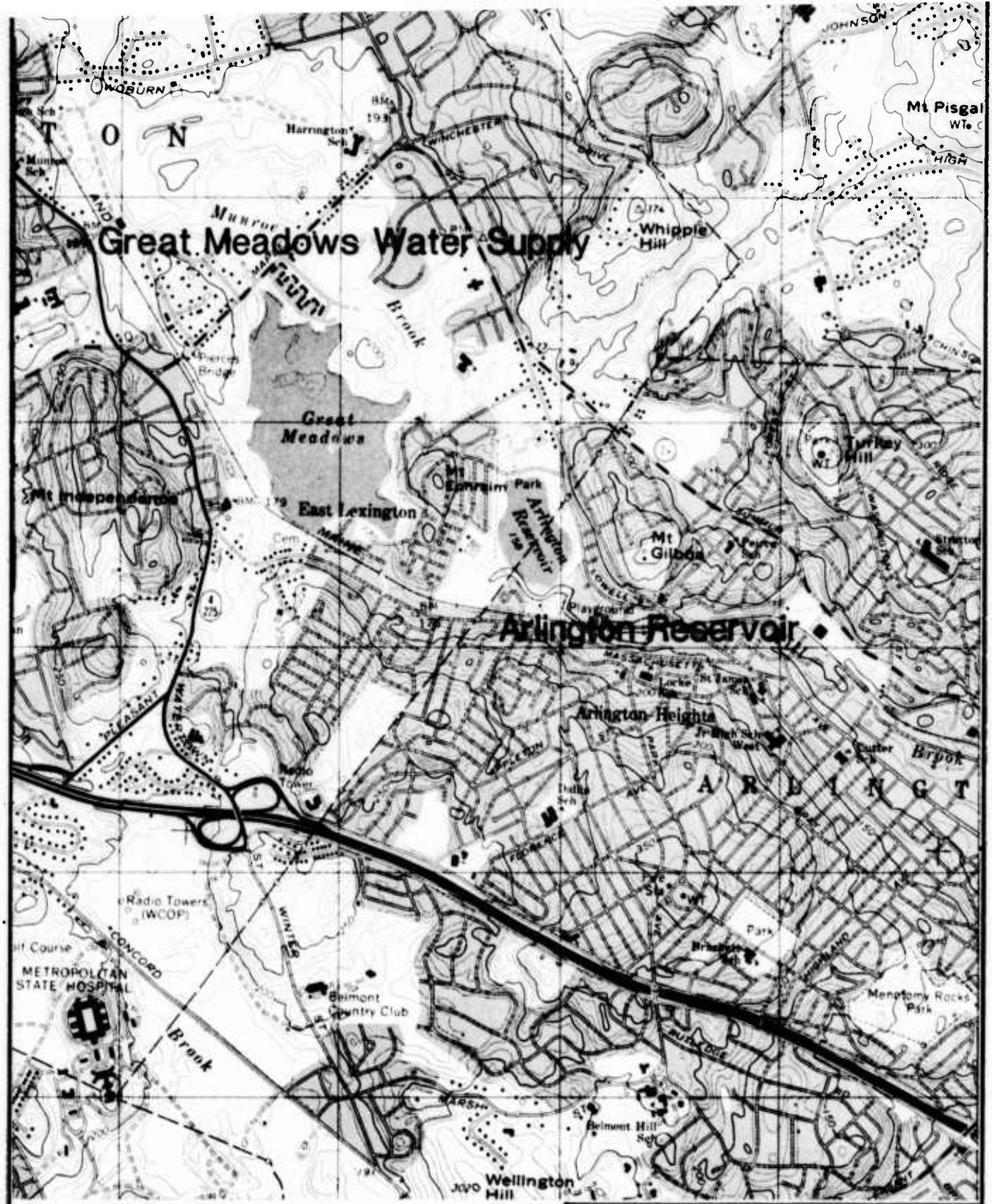
Treatment Required: Chlorination and iron removal.

Estimated Cost of Treatment: $1,200,000 for a 1.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $1,335,000 including $135,000 for developing new wells and pumping facilities.

Great Meadows. Water supply for Arlington, Massachusetts. Average chemical analysis for 1899. Data from the Massachusetts State Board of Health Annual Report of 1899. Chemical values in parts per 100,000.

Number of Samples	6
Color	.56
Residue on Evaporation	8.63
Free Ammonia	.0250
Albuminoid Ammonia	.0120
Chlorine	.50
Nitrogen as Nitrates	.0067
Nitrogen as Nitrites	.0000
Oxygen Consumed	.24
Hardness	3.9
Iron	.1647



Great Meadows and Arlington Reservoir Water Supply for Arlington, Mass.

Coffin & Richardson, Inc.
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ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
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Waltham, Mass.
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ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Lake Cochituate

Location: In Natick, Wayland and Framingham.

Community Served: Boston

Type of Supply: Surface

Description: Drainage area 17.4 square miles, surface area 730 acres, storage 5 billion gallons, usable storage 2 billion gallons.

Last Reported or Estimated Yield: 8.0 mgd.

Year Developed: 1848

Year Removed from Normal Service: 1931

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination.

Watershed in which Supply is Located: Sudbury River

Present Ownership and Use of Supply Site: Owned by Mass. Dept. of Environmental Management (MDC owns water rights) and used for recreational pruposes such as boating. Much of the shoreline has been developed for private homes.

Reported Water Quality Defects: Color, taste, odor, iron.

Feasibility of Reactivation: Unfeasible - would reduce yield of wells now used by Town of Framingham and Town of Natick.

1978 MDC Water Use by Community: 52,213.55 mg or 143.05 mgd.

Lake Cochituate. Water supply for Boston, Massachusetts. Average chemical analysis based on 10 samples taken between April 20, 1976 and April 12, 1978 at a depth of 5 feet. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

	South Basin	Middle Basin	North Basin
pH	7.4	7.3	7.6
Total Alkalinity	26	22	23
Total Hardness	44	43	43
Suspended Solids	4.5	3.0	3.0
Total Solids	192	169	155
Specific Conductivity (micromhos/cm)	250	254[1]	235[1]
Total Kjeldahl Nitrogen	0.54[1]	0.56[1]	0.53[1]
Ammonia-Nitrogen	0.06	0.03	0.03[1]
Nitrite-Nitrogen	0.005	0.005[1]	0.003
Nitrate-Nitrogen	0.2	0.3	0.3
Orthophosphate	0.01	0.01	0.01
Total Phosphorus	0.03	0.03	0.03
Silica	2.4	0.9	1.9
Chloride	53	57	50
Total Iron	0.23	0.11	0.08
Total Manganese	0.07	0.03	0.04
Color	30	20	15

[1] Based on 9 samples.

Lake Cochituate
Water Supply for Boston, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Charles River Supply

Location: In West Roxbury and Dedham, along the Charles River below Cow Island Pond, adjacent to Sawmill Brook.

Community Served: Brookline

Type of Supply: Groundwater

Description: Infiltration gallery near the Charles River and 175, 2-1/2 inch tubular wells, 40-90 feet deep. Site contained 295 acres of which 66 were in West Roxbury and 229 were in Dedham.

Last Reported or Estimated Yield: 3.75 mgd.

Year Developed: 1875

Year Removed from Normal Service: 1953

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Aeration and filtration.

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: West Roxbury part owned by the City of Boston and used for solid waste disposal. Dedham section is a wetland area owned by the MDC Parks Division.

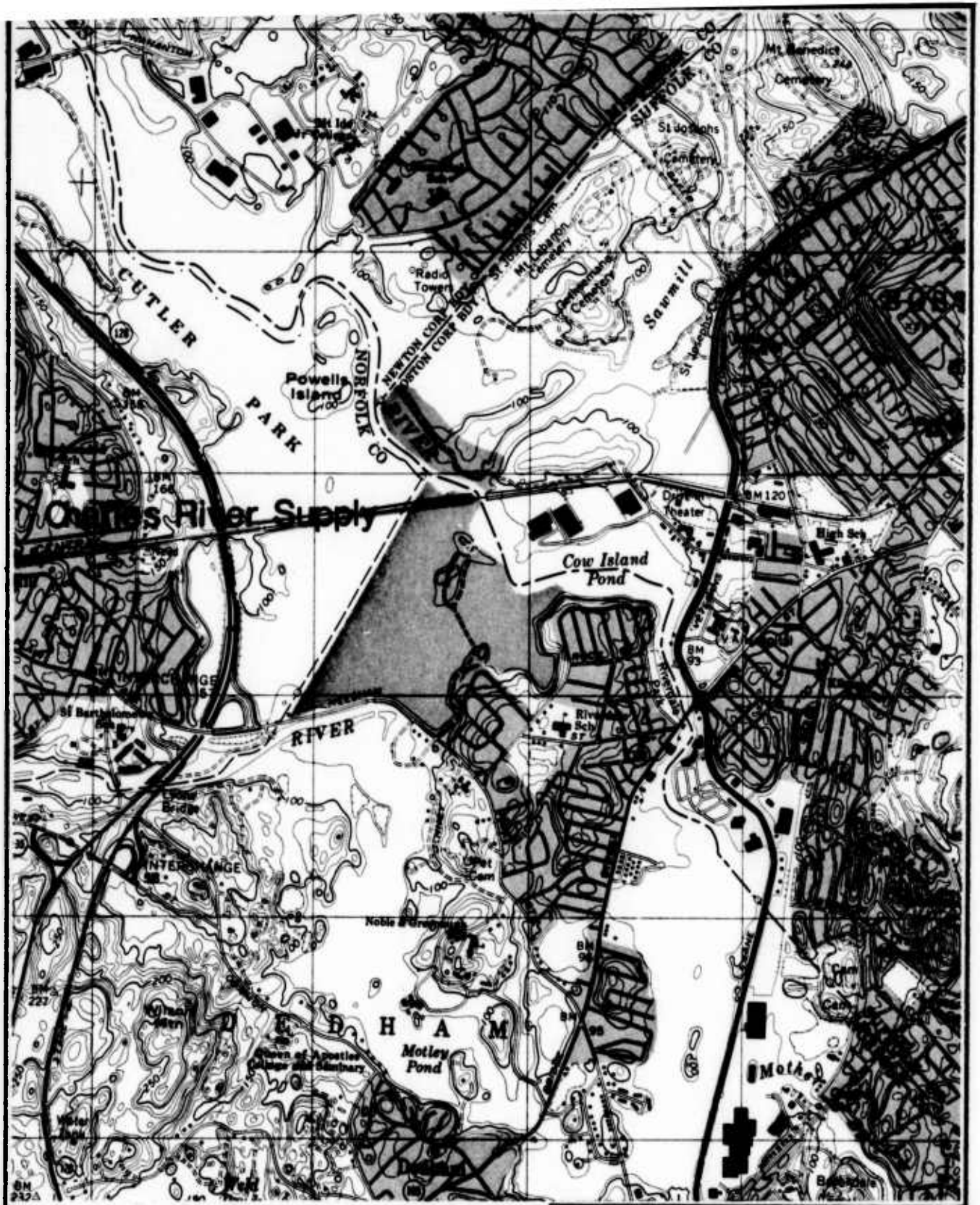
Reported Water Quality Defects: Iron and manganese.

Feasibility of Reactivation: Unfeasible-West Roxbury section of area is now a solid waste disposal site.

1978 MDC Water Use by Community: 2,766.62 mg or 7.58 mgd.

Charles River Supply. Water supply for Brookline, Massachusetts. Average chemical analysis for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	3
Color	50
Nitrogen as Nitrates	.42
Nitrogen as Nitrites	.003
Chlorides	9.9
Hardness	45
Alkalinity	45
Manganese	.39
Iron	2.3
pH	6.4



Charles River Supply
Water Supply for Brookline, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
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Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Springdale Supply

Location: In Canton and north Stoughton along Beaver Meadow Brook and Redwing Brook.

Community Served: Canton

Type of Supply: Groundwater

Description: In Canton a dug well and 19 tubular wells east of Pine Street at Springdale and a dug well at the end of Ward Well Road. In Stoughton, a dug well north of York Street at Henry's Spring.

Last Reported or Estimated Yield: .70 mgd.

Year Developed: Springdale and Henry's Spring 1889-1894, Ward 1927.

Year Removed from Normal Service: Ward Well in 1952, Springdale and Henry's Spring in 1969.

Reason for Removal from Service: Breaks in lines between wells allowed poor quality surface water to contaminate the supply.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: East Branch of Neponset River

Present Ownership and Use of Supply Site: Owned or leased by Town of Canton, no specific use of sites but local residents apparently use the sites for recreation.

Reported Water Quality Defects: Occassional turbidity, color, iron, manganese, nitrates and sodium.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 356.00 mg or .97 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Springdale Supply

Major Downstream Users to be Impacted by Reduced Flow. Canton and the Dedham Water Company have wells along the Neponset River.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation could have an adverse impact upon the Neponset River during periods of low flow.

Pollution Sources on Watershed: Runoff from roads and residential areas.

Water Quality Parameters Requiring Treatment: Turbidity, color, iron, manganese and nitrates.

Treatment Required: Chlorination, coagulation, sedimentation, and filtration.

Estimated Cost of Treatment: $900,000 for a .70 mgd treatment plant.

Estimated Total Cost of Reactivation:

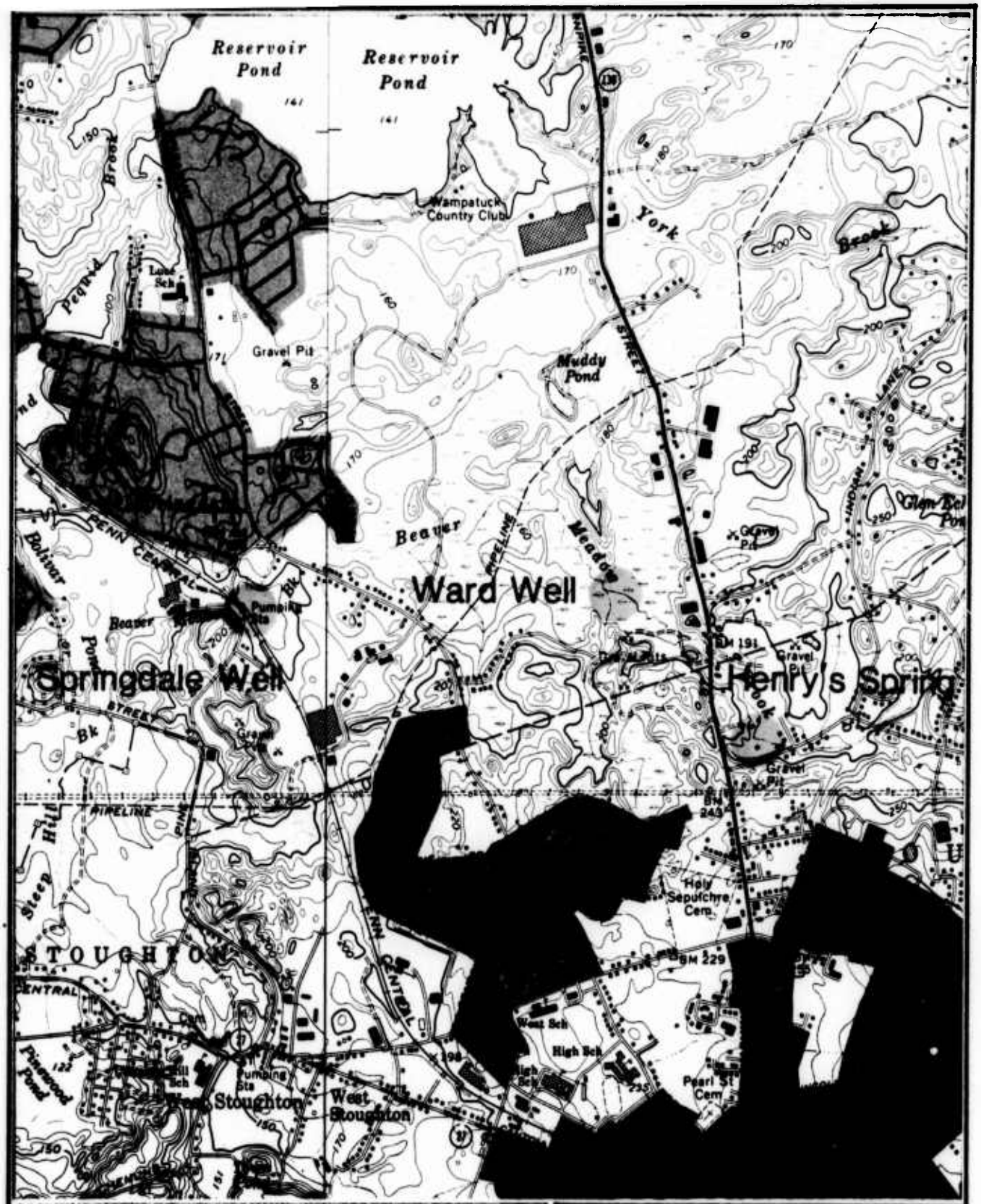
$1,430,000 including $530,000 for new mains between the wells.

Springdale Supply. Water supply for Canton, Massachusetts. Chemical analysis of Springdale Well and Henry's Spring of March 30, 1969. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

	Springdale Well	Henry's Spring
Turbidity	0	0
Sediment	0	0
Color	10	5
Odor	10	0
pH	6.3	6.2
Alkalinity	15	15
Hardness	42	46
Iron	.00	.01
Manganese	.06	.02
Nitrogen as Nitrites	.000	.000
Nitrogen as Nitrates	1.5	2.0
Chloride	50.0	60.0
Fluoride	<0.1	0.0

Springdale Supply. Water supply for Canton, Massachusetts. Average chemical analysis of Ward Well for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	3
Color	9
Nitrogen as Nitrates	1.0
Nitrogen as Nitrites	.000
Chlorides	7.9
Hardness	23
Alkalinity	14
Iron	.05
pH	6.2



Springdale Supply
Water Supply for Canton, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Chicopee River Canal

Location: In Chicopee, just west of the Montgomery Street bridge.

Community Served: Chicopee

Type of Supply: Surface

Description: Water taken through a canal, about 2,000 feet long, on the south side of the Chicopee River.

Last Reported or Estimated Yield: 10.0 mgd based on minimum flow.

Year Developed: 1883

Year Removed from Normal Service: 1893

Reason for Removal from Service: A mild outbreak of typhoid fever was believed to be related to use of this source.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Chicopee River-Conn. River

Present Ownership and Use of Supply Site: Privately owned industrial area. Canal is no longer in existence.

Reported Water Quality Defects: Color, turbidity, and iron.

Feasibility of Reactivation: Potentially feasible to take water from the Chicopee River.

1978 MDC Water Use by Community: 4,480.84 mg or 12.28 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Chicopee River Canal

Major Downstream Users to be Impacted by Reduced Flow: None - treated wastewater would be returned to the watershed.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: Residential, commercial, and industrial developments.

Water Quality Parameters Requiring Treatment: Turbidity, color, and iron.

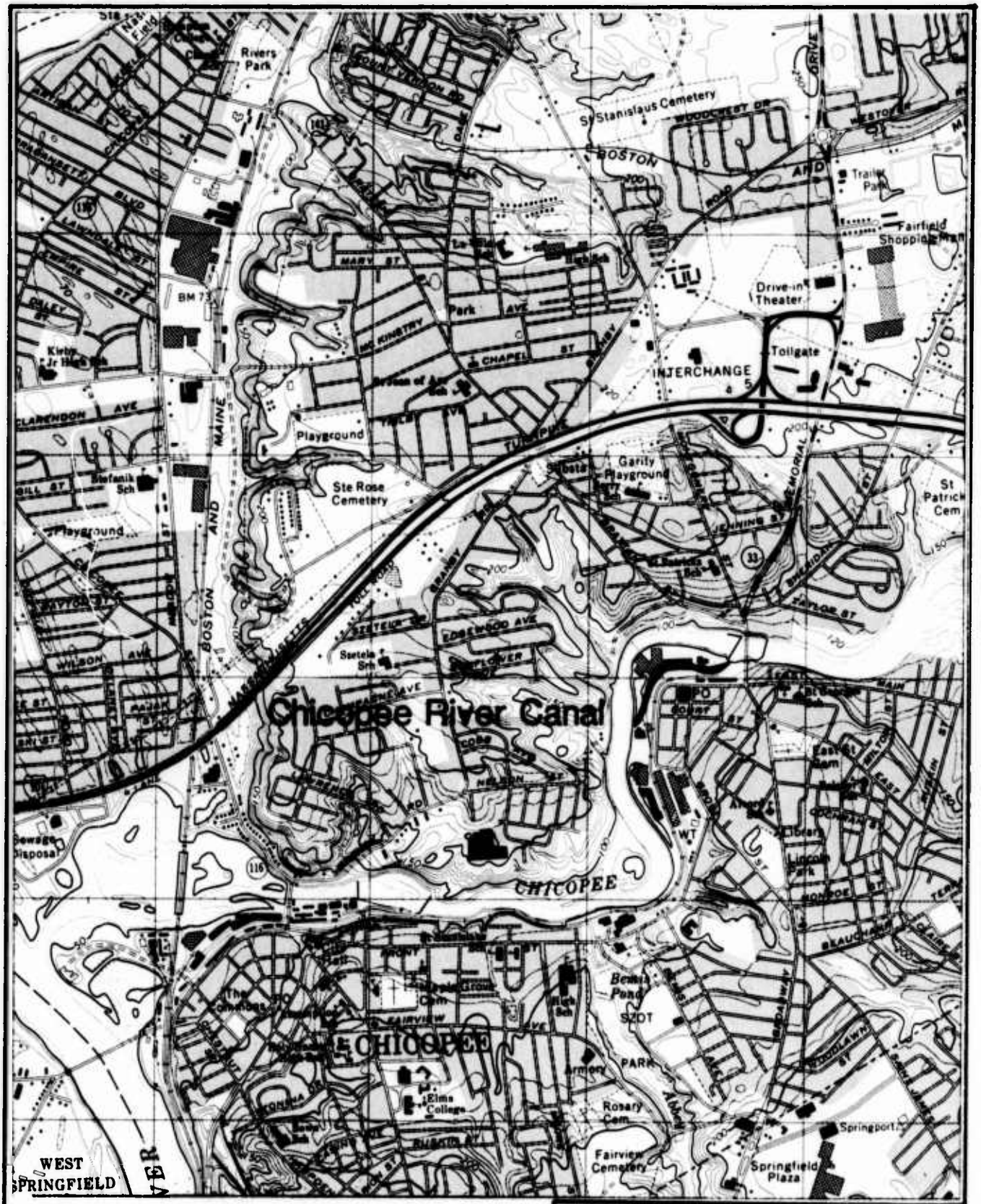
Treatment Required: Chlorination, coagulation, sedimentation, filtration and activated carbon.

Estimated Cost of Treatment: $19,000,000 for a 20.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $20,000,000 including $1,000,000 to purchase land and prepare the site for the treatment plant.

Chicopee River Canal. Water supply for Chicopee, Massachusetts. Average chemical analysis of the Chicopee River for the summer of 1978. Samples taken at the Route 116 bridge in Chicopee. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Number of Samples	4
pH	7.4
Total Alkalinity	19
Suspended Solids	5.3
Total Solids	88.5
Color	36
Turbidity	1.3
Chlorides	15
Total Nitrogen	1.47
Ammonia Nitrogen	.04
Nitrate Nitrogen	.25
Total Phosphorus	.11
Oil & Grease	1.4
Copper	.01
Chromium	.00
Iron	.65
Cadmium	.00
Mercury	.0000
Lead	.00
Zinc	.00
Nickel	.00



Chicopee River Canal
Water Supply for Chicopee, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Cooley Brook and Morton Brook Reservoirs

Location: In Chicopee, approximately 3/4 of a mile above the Chicopee River, just south of Westover AFB.

Community Served: Chicopee

Type of Supply: Surface

Description: Cooley Brook Res. - surface area 30 acres, drainage area 2880 acres, storage capacity 145 mg. Morton Brook Res. - surface area 4 acres, drainage area 224 acres, storage .2mg.

Last Reported or Estimated Yield: 3.03 mgd.

Year Developed: 1883, Cooley rebuilt in 1913.

Year Removed from Normal Service: 1950

Reason for Removal from Service: Inability to meet the needs of the City.

Treatment Prior to Removal from Service: Chlorination beginning in 1926, rapid sand filtration beginning in 1931.

Watershed in which Supply is Located: Chicopee River

Present Ownership and Use of Supply Site: Chicopee Memorial State Park. Swimmming and other recreation. Owned by the Massachusetts Department of Environmental Management.

Reported Water Quality Defects: Color.

Feasibility of Reactivation. Potentially feasible if swimming in reservoir is eliminated.

1978 MDC Water Use by Community: 4,480.84 mg or 12.28 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Cooley Brook and Morton Brook Reservoirs

Major Downstream Users to be Impacted by Reduced Flow: None - treated wastewater would be returned to the watershed.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: Runoff from Westover Air Force Base and roads.

Water Quality Parameters Requiring Treatment: Color

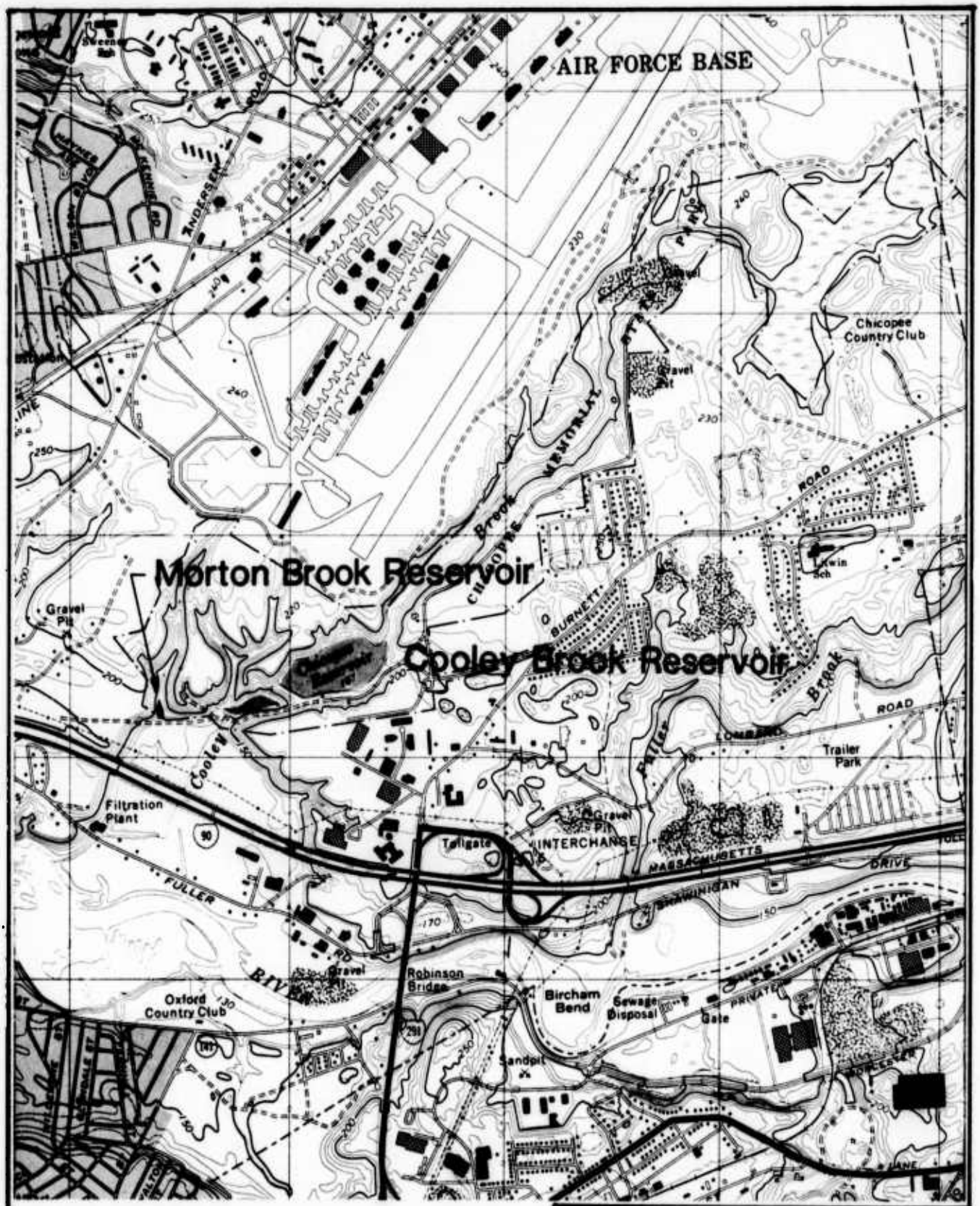
Treatment Required: Chlorination, coagulation, sedimentation and filtration.

Estimated Cost of Treatment: $5,400,000 for a 6.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $5,700,000 including $300,000 to purchase land and prepare the site for the treatment plant.

Cooley Brook and Morton Brook Reservoirs. Water supply for Chicopee, Massachusetts. Average chemical analysis for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

	Cooley - Raw water	Morton - Raw Water
Number of Samples	3	3
Color	34	7
Free Ammonia	.031	.013
Albuminoid Ammonia	.124	.025
Nitrates	.43	.87
Chlorides	2.7	3.3
Hardness	22	23
Alkalinity	17	12
Iron	.23	.23
pH	6.7	6.6



Cooley Brook and Morton Brook Reservoirs
Water Supply for Chicopee, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Abbey Brook Supply

Location: In Springfield, east of Liberty Street, just south of the Springfield Shopping Plaza.

Community Served: Chicopee

Type of Supply: Surface and Groundwater

Description: Reservoir with surface area of 3.5 acres, drainage area of 480 acres and storage of 5 mg. Also, a reservoir with a 1/4 acre surface area with 6 dug wells in the bottom.

Last Reported or Estimated Yield: .20 mgd.

Year Developed: Small reservoir 1845; large reservoir 1877.

Year Removed from Normal Service: Small reservoir 1918, large reservoir 1927.

Reason for Removal from Service: Poor water quality due to location of a dump nearby on Carew Street.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Abbey Brook - Chicopee River

Present Ownership and Use of Supply Site: Privately owned woodland which is not in use. Reservoirs have been drained.

Reported Water Quality Defects: Taste and odor.

Feasibility of Reactivation: Unfeasible, surrounding area is heavily developed and an old solid waste disposal site is nearby.

1978 MDC Water Use by Community: 4,480.84 mg or 12.28 mgd.

Abbey Brook Supply. Water supply for Chicopee, Massachusetts. Chemical analysis of January 3, 1899. Data from the Massachusetts State Board of Health Annual Report of 1899. Chemical values in parts per 100,000.

Turbidity	Very Slight
Sediment	Very Slight
Color	.05
Residue on Evaporation	
Total	5.10
Loss on Ignition	1.80
Free Ammonia	.0036
Albuminoid Ammonia	
Total	.0098
Dissolved	.0062
Suspended	.0036
Chlorine	.26
Nitrogen as Nitrates	.1920
Nitrogen as Nitrites	.0003
Oxygen Consumed	.09
Hardness	1.7

Abbey Brook Supply
Water Supply for Chicopee, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Wekepeke Brook Supply

Location: In Sterling, near the Leominster-Sterling line, west of Route 12.

Community Served: Clinton

Type of Supply: Surface

Description: Four reservoirs, combined surface area 56.5 acres, combined drainage area 1,178 acres, combined usable storage 230.9 mg.

Last Reported or Estimated Yield: 1.20 mgd.

Year Developed: From 1882 to 1926.

Year Removed from Normal Service: Three reservoirs in 1933, one used until 1964, now a reserve.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: North Nashua River

Present Ownership and Use of Supply Site: Owned by Town of Clinton, held as a reserve water supply.

Reported Water Quality Defects: Color

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 832.80 mg or 2.28 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Wekepeke Brook Supply

Major Downstream Users to be Impacted by Reduced Flow: None - treated wastewater would be returned to the watershed.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: None

Water Quality Parameters Requiring Treatment: Color

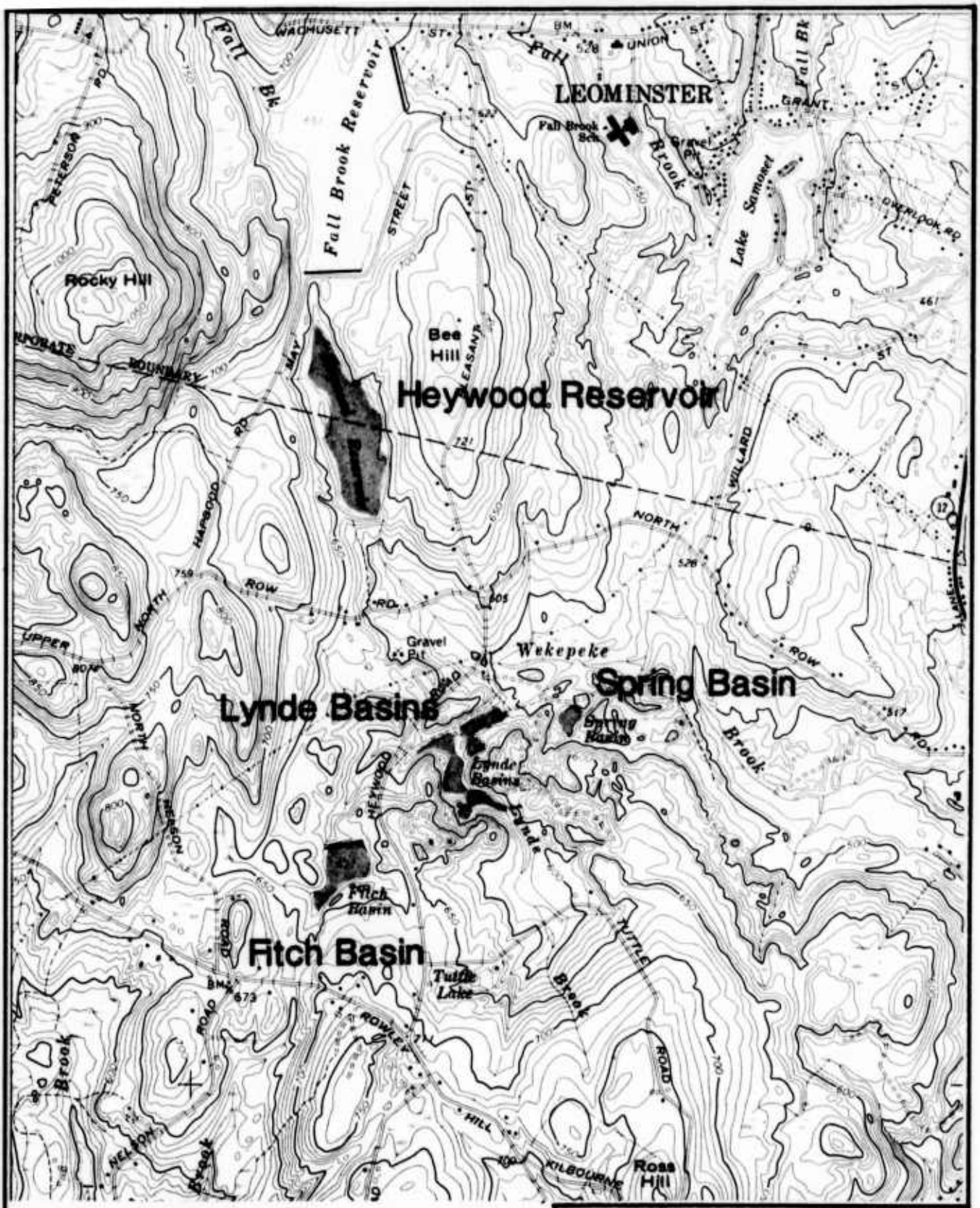
Treatment Required: Chlorination, coagulation, sedimentation, and filtration.

Estimated Cost of Treatment: $2,500,000 for a 2.40 mgd treatment plant.

Estimated Total Cost of Reactivation: $4,000,000 including $1,500,000 to clean and line mains and to purchase and prepare the site for the treatment plant.

Wekepeke Brook Supply. Water supply for Clinton, Massachusetts. Average chemical analysis for 1960. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

	Heywood Reservoir	Lynde Basin	Spring Basin
Number of Samples	3	3	3
Color	22	25	13
Free Ammonia	0.04	0.08	0.03
Albuminoid Ammonia	0.22	0.25	0.13
Hardness	11.0	20.0	31.0
Alkalinity	2.0	10.0	17.0
Iron	—	—	0.03
pH	6.9	6.8	6.8



Wekepeke Brook Supply
Water Supply for Clinton, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Upper Mystic Lake

Location: In Arlington, Medford, and Winchester.

Community Served: Chelsea, Everett, Somerville and Charlestown.

Type of Supply: Surface

Description: Reservoir with a surface area of 167 acres, a drainage area of 26.9 square miles, and a usable storage capacity of 380 mg.

Last Reported or Estimated Yield: 7.0 mgd.

Year Developed: 1864

Year Removed from Normal Service: 1898

Reason for Removal from Service: Poor water quality. Communities served joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Mystic River

Present Ownership and Use of Supply Site: Partially owned by MDC Parks Division and partially privately owned. Used for boating.

Reported Water Quality Defects: High total solids, iron, manganese, color, taste, odor, sodium and chlorides.

Feasibility of Reactivation: Unfeasible due to hazards associated with the intensely developed watershed, high chlorides and total solids.

1978 MDC Water Use by Community: 7,589.13 mg or 20.79 mgd.

Upper Mystic Lake. Water supply for Chelsea, Everett, Somerville and Charlestown, Massachusetts. Average chemical analysis based on 11 samples taken between May 21, 1974 and April 16, 1975. Samples taken near surface at outlet to Lower Mystic Lake. Data from Upper Mystic Lake 1974-1975 Water Quality Study by the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

pH	7.7
Total Alkalinity	41
Total Hardness	89
Ammonia-Nitrogen	3.02
Nitrite-Nitrogen	.058[1]
Nitrate-Nitrogen	1.9
Total Phosphorus	0.05
Silica	3.9
Conductivity (micromhos/cm)	522[2]
Chloride	141[3]
Iron	.16[4]
Manganese	.22[4]
Color	25[5]

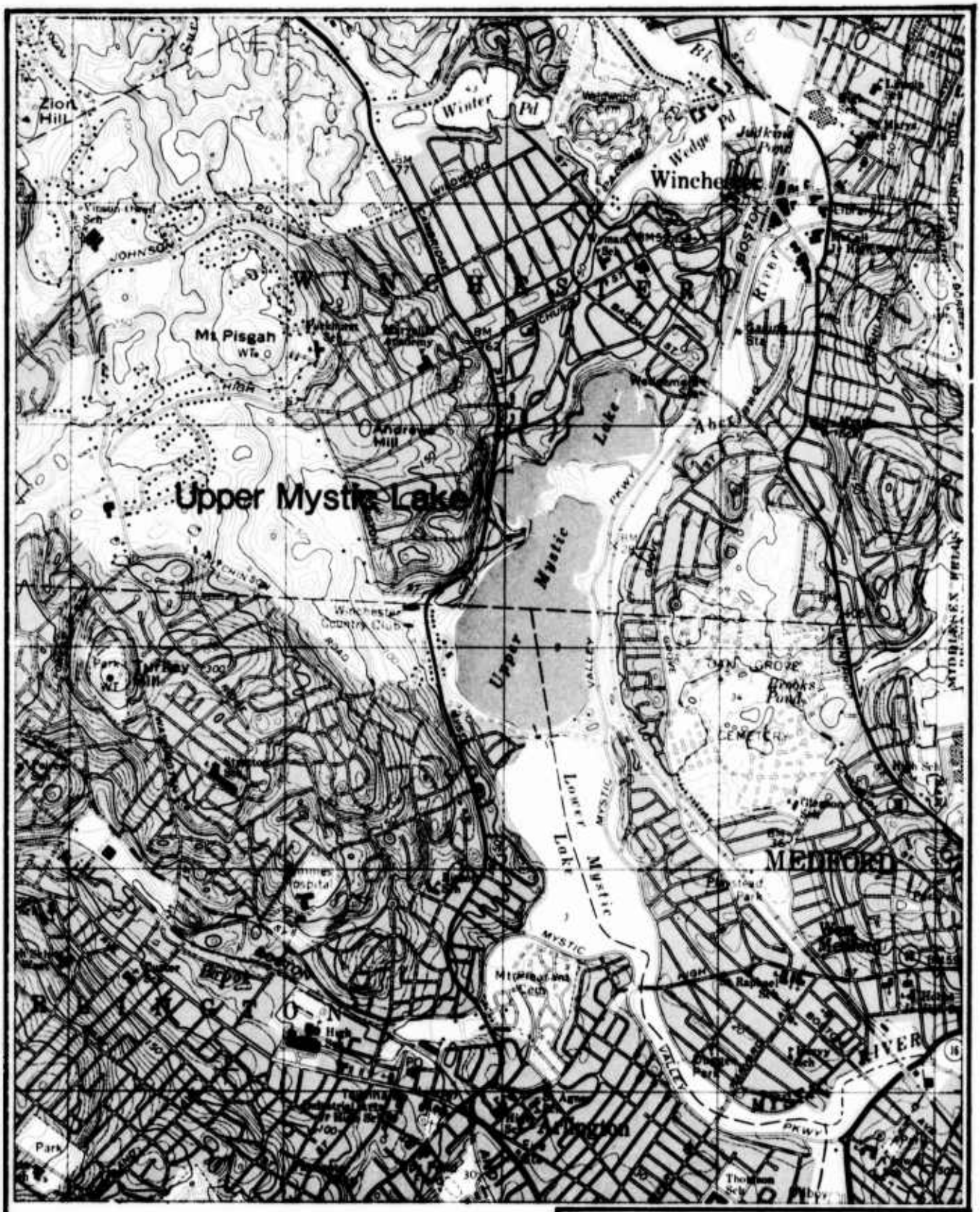
[1] Based on 4 samples.

[2] Based on 10 samples.

[3] Based on 4 samples taken in winter months.

[4] Based on 3 samples.

[5] Based on 1 sample taken 2-18-75.



Upper Mystic Lake
Water Supply for Chelsea, Everett, Somerville and Charlestown, Mass.
Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Farm Pond

Location: In Framingham, north of Route 135 and east of Dudley Park Road.

Community Served: Framingham

Type of Supply: Surface

Description: Two filter galleries, both 4 feet wide by 4 feet high, one 200 feet long and the other 250 feet long. Pond has surface area of 165 acres, drainage area of 346 acres and storage of 167.5 mg.

Last Reported or Estimated Yield: .70 mgd.

Year Developed: 1885 by Framingham Water Company.

Year Removed from Normal Service: 1939

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination, water drawn through two filter galleries.

Watershed in which Supply is Located: Eames Brook-Sudbury River

Present Ownership and Use of Supply Site: Part of shoreline owned by the Town of Framingham and used as a park. Old pumphouse site is owned by the Town of Framingham. Much of shoreline is privately owned and devoted to residential and industrial uses.

Reported Water Quality Defects: Color, taste and odor.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 3,080.40 mg or 8.44 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Farm Pond

Major Downstream Users to be Impacted by Reduced Flow: None - Communities taking water downstream on the Sudbury, Concord, and Merrimack River would not likely be impacted by the withdrawal of the amount of water which could be taken from Farm Pond.

Known Water Rights Affecting or Precluding Use of Supply: The MDC holds the water rights to Farm Pond.

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: Industrial, commercial, and residential developments and street drainage. A trunk sewer line runs along the eastern shoreline of the pond.

Water Quality Parameters Requiring Treatment: Color, taste, and odor.

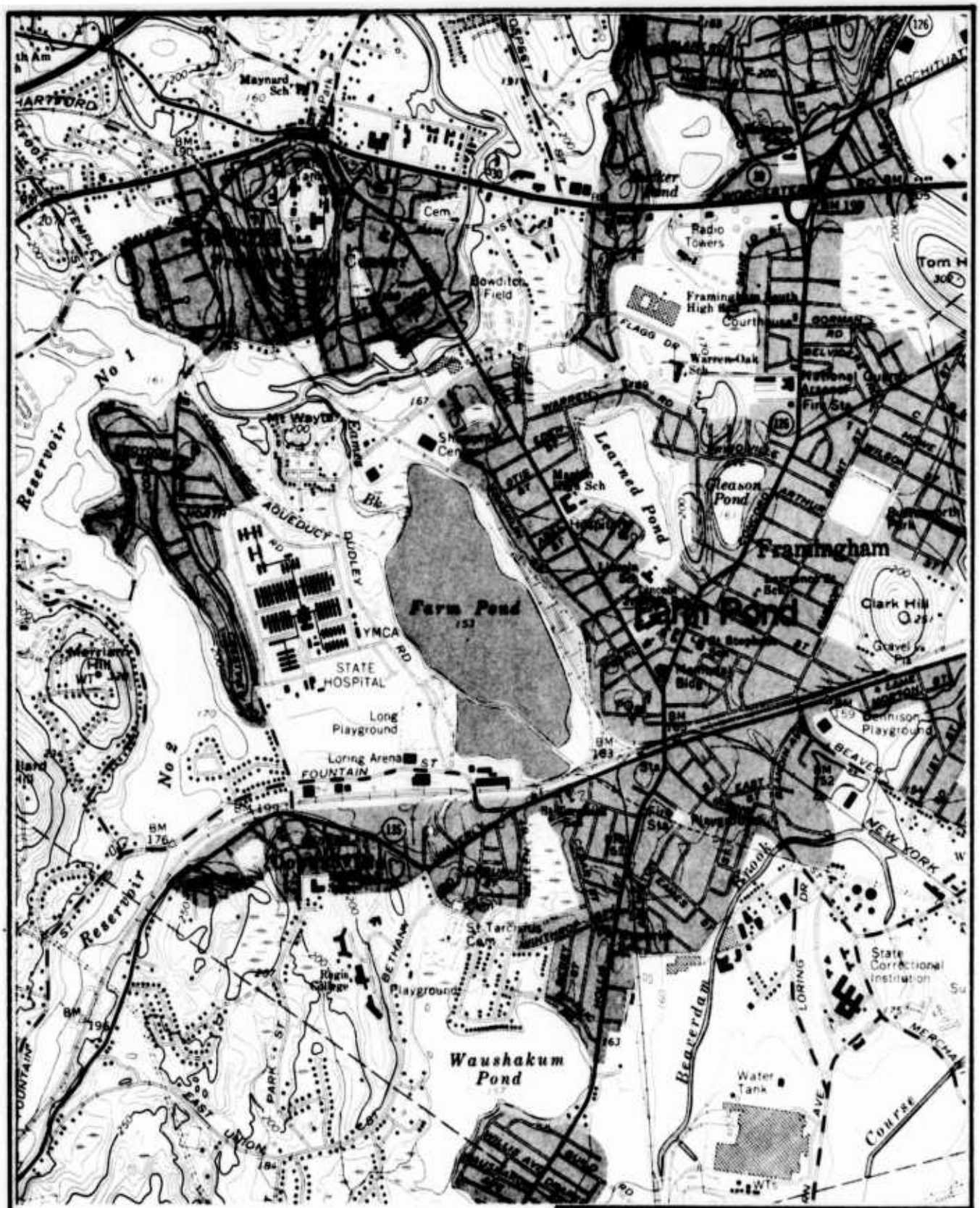
Treatment Required: Chlorination, coagulation, sedimentation, filtration, and activated carbon.

Estimated Cost of Treatment: $2,200,000 for a 1.40 mgd treatment plant.

Estimated Total Cost of Reactivation: $2,250,000 including $50,000 for a new pumping station.

Farm Pond. Water supply for Framingham, Massachusetts. Average chemical analysis for 1937. Data from the Massachusetts State Board of Health Annual Report of 1937. Chemical values in parts per million.

	North Filter Gallery	South Filter Gallery
Number of Samples	5	5
Color	5	1
Residue on Evaporation	132	130
Free Ammonia	.122	.382
Albuminoid Ammonia	.041	.074
Nitrogen as Nitrates	.18	.13
Nitrogen as Nitrites	.000	.001
Chlorides	18.3	20.3
Hardness	60	61
Alkalinity	45	43
Iron	.22	.07



Farm Pond
Water Supply for Framingham, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Vine Brook Supply

Location: In Lexington, north of Marret Road and east of Lincoln Street along Vine Brook.

Community Served: Lexington

Type of Supply: Groundwater and Surface

Description: Four large dug wells and 10 to 15 tubular wells averaging 27 feet deep. Also a reservoir with a surface area of 6 acres, drainage area of 192 acres and storage capacity of 14 mg.

Last Reported or Estimated Yield: .20 to .30 mgd.

Year Developed: Wells from 1884 to 1902. Reservoir in 1897.

Year Removed from Normal Service: 1902

Reason for Removal from Service: Lexington joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Vine Brook-Shawsheen River

Present Ownership and Use of Supply Site: Owned by the Town of Lexington. Reservoir is used for swimming and fishing. Part of the area is wetland, part is a ball park and part is the site of a school.

Reported Water Quality Defects: None

Feasibility of Reactivation: Unfeasible-part of site was a solid waste disposal site, could reduce yield of Burlington wells on Vine Brook

1978 MDC Water Use by Community: 2,000.15 mg or 5.48 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Vine Brook Supply. Water supply for Lexington, Massachusetts. Average Chemical analysis for 1902. Data from the Massachusetts State Board of Health Annual Report of 1902. Chemical values in parts per 100,000.

Number of Samples	6
Color	0.48
Residue on Evaporation	
Total	9.68[1]
Loss on Ignition	4.22[1]
Free Ammonia	.0017
Albuminoid Ammonia	
Total	.0178[2]
Dissolved	.0166[2]
Suspended	.0012[2]
Chlorine	.51
Nitrogen as Nitrates	.1382
Nitrogen as Nitrites	.0002
Oxygen Consumed	0.56
Hardness	3.7

[1]Represents an average of 3 samples.

[2]Represents an average of 4 samples.

Vine Brook Supply
Water Supply for Lexington, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Maplewood Wells

Location: In Malden, south of Eastern Ave. between Lisbon and Crystal Streets.

Community Served: Malden

Type of Supply: Groundwater

Description: Ninety-nine 2½ inch tubular wells.

Last Reported or Estimated Yield: 1.0 mgd.

Year Developed: 1889 to 1895

Year Removed from Normal Service: 1898

Reason for Removal from Service: Poor water qualtiy, Malden joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Malden River-Mystic River

Present Ownership and Use of Supply Site: Partially owned by the City of Malden and used as the site for a high school. Partially privately owned and used as the site for industry.

Reported Water Quality Defects: Highly mineralized-hard water.

Feasibility of Reactivation: Unfeasible-Major relocation of surface structures would be necessary.

1978 MDC Water Use by Community: 2,368.87 mg or 6.49 mgd.

Maplewood Wells. Water supply for Malden, Massachusetts. Average chemical analysis for 1898. Data from the Massachusetts State Board of Health Annual Report of 1898. Chemical values in parts per 100,000.

Number of Samples	11
Color	.02
Residue on Evaporation	28.41
Free Ammonia	.0019
Albuminoid Ammonia	.0026
Chlorides	2.69
Nitrogen as Nitrates	.3426
Nitrogen as Nitrites	.0000
Oxygen Consumed	.05
Hardness	13.6
Iron	.0143

Maplewood Wells
Water Supply for Malden, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Thompsons Meadow

Location: In Salem, northeast of Swampscott Road and northwest of Boston and Maine Railroad tracks.

Community Served: Marblehead, Swampscott, Nahant

Type of Supply: Groundwater

Description: Twenty-one 2½ inch tubular wells from 1897 to 1899. Sixteen 2½ inch tubular wells 34 to 73 feet deep installed in 1923.

Last Reported or Estimated Yield: .20 mgd.

Year Developed: 1897-99 by Swampscott, Nahant. 1923 by Marblehead.

Year Removed from Normal Service: 1949

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Slow sand filtration, aeration to remove iron, and chlorination.

Watershed in which Supply is Located: Forest River

Present Ownership and Use of Supply Site: Owned by the Town of Marblehead. The area is a wetland.

Reported Water Quality Defects: High iron content.

Feasibility of Reactivation: Unfeasible - solid waste disposal site upstream.

1978 MDC Water Use by Community: 1,812.44 mg or 4.97 mgd.

Thompsons Meadow. Water supply for Marblehead, Swampscott and Nahant, Massachusetts. Average chemical analysis for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	3
Color	60
Nitrogen as Nitrates	.13
Nitrogen as Nitrites	.002
Chlorides	15.2
Hardness	102
Alkalinity	109
Iron	1.87
pH	6.9

Thompsons Meadow
Water Supply for Marblehead, Swampscott and Nahant, Mass.
Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Loring Avenue Supply

Location: In Salem, southeast of Loring Avenue, between Lindon Street and Legg Hill Road.

Community Served: Marblehead

Type of Supply: Groundwater

Description: Two dug wells, one 25 feet in diameter by 33.5 feet deep and the other 30 feet in diameter by 30 feet deep. Also 39 tubular wells.

Last Reported or Estimated Yield: .63 mgd.

Year Developed: 1889

Year Removed from Normal Service: 1949

Reason for Removal from Service: Poor water quality, salt water intrusion.

Treatment Prior to Removal from Service: Iron removal by aeration and filtration.

Watershed in which Supply is Located: Forest River

Present Ownership and Use of Supply Site: Owned by the Town of Marblehead. The area is a wetland.

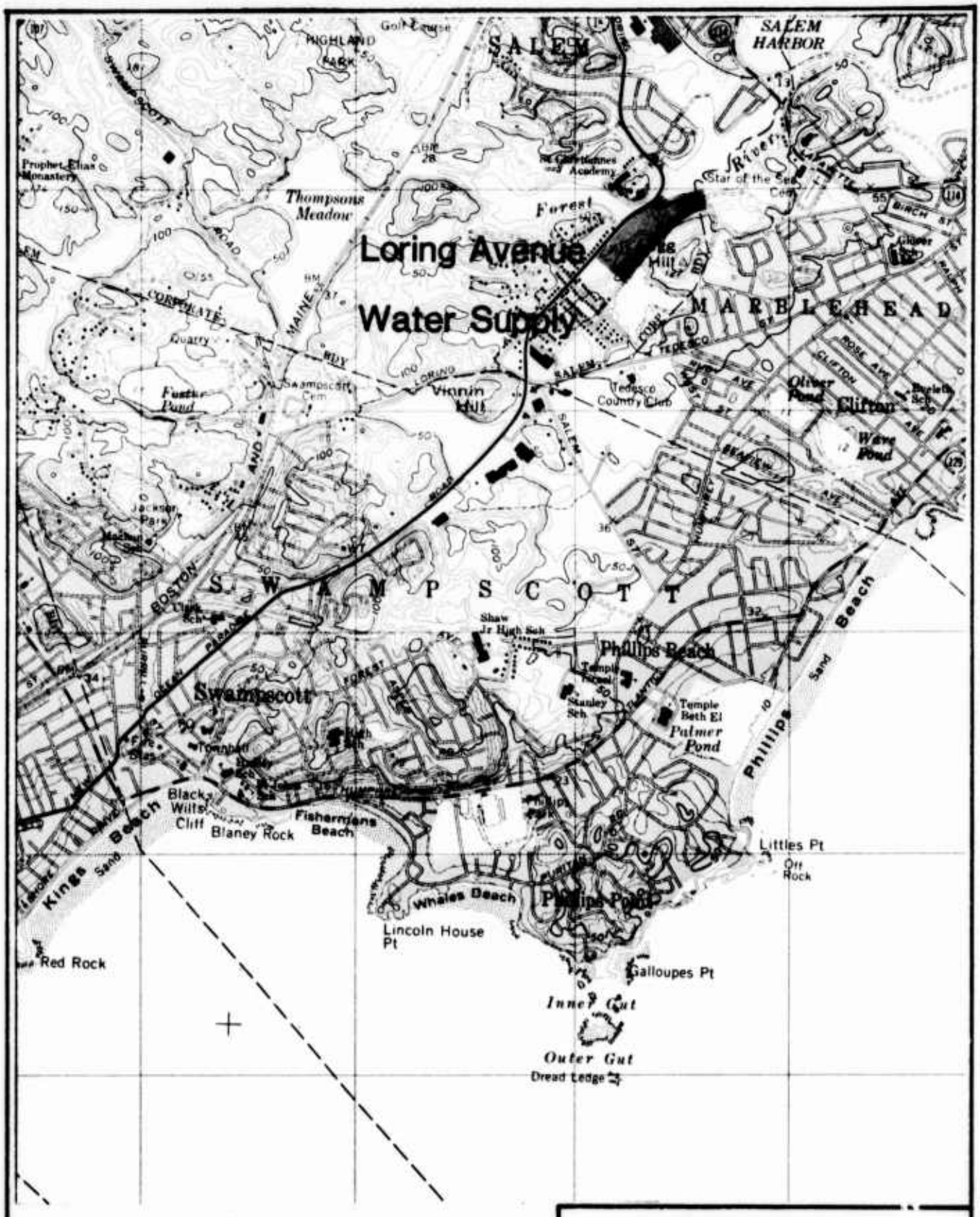
Reported Water Quality Defects: High iron content, also high manganese and salt water intrusion.

Feasibility of Reactivation: Unfeasible-desalination would be necessary.

1978 MDC Water Use by Community: 909.91 mg or 2.49 mgd.

Loring Avenue Supply. Water supply for Marblehead, Massachusetts. Average chemical analysis for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	3
Color	5
Nitrogen as Nitrates	.22
Nitrogen as Nitrites	.000
Chlorides	14.7
Hardness	73
Alkalinity	46
Manganese	.12
Iron	.55
pH	6.6



Loring Avenue Supply
Water Supply for Marblehead, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Williams Lake

Location: In Marlborough, south of Lakeside Avenue (Rt.20) and east of Rt. 495.

Community Served: Marlborough

Type of Supply: Surface

Description: Lake with a surface area of 73 acres, a drainage area of 219 acres and a storage capacity of 250 mg.

Last Reported or Estimated Yield: .30 mgd.

Year Developed: 1883

Year Removed from Normal Service: Use reduced in 1961 when Marlborough joined the MDC, presently used as a reserve supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination and corrosion control.

Watershed in which Supply is Located: Assabet River

Present Ownership and Use of Supply Site: Owned by the City of Marlborough and held as a reserve water supply.

Reported Water Quality Defects: Taste, odor, high sodium content.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 1,146.47 mg or 3.14 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Williams Lake

Major Downstream Users to be Impacted by Reduced Flow: Reactivation would reduce the amount of dilution water for sewerage treatment plant discharges by Marlborough, Hudson and Maynard.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation will reduce the flow of the Assabet River.

Pollution Sources on Watershed: Runoff from roads and residential and commercial developments.

Water Quality Parameters Requiring Treatment: Taste and odor.

Treatment Required: Chlorination, flocculation, carbon addition, settling and filtration.

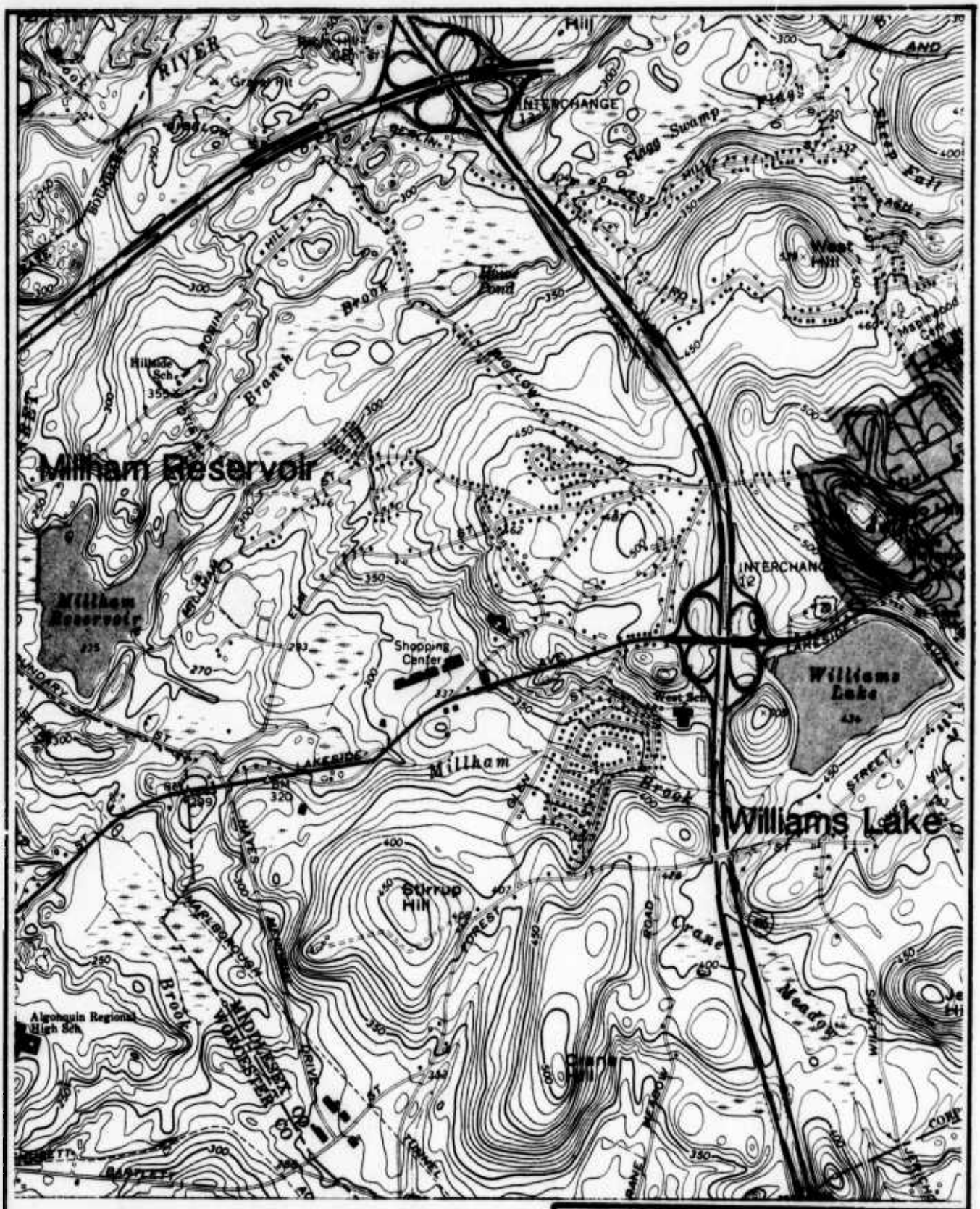
Estimated Cost of Treatment: See Millham Reservoir estimate.

Estimated Total Cost of Reactivation: See Millham Reservoir estimate.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Williams Lake. Water supply for Marlborough. Chemical analysis of March 25, 1979. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	0.7
Sediment	0
Color	12
Odor	0
pH	6.5
Alkalinity (Total $CaCO_3$)	16
Hardness ($CaCO_3$)	57
Calcium (Ca)	18
Magnesium (Mg)	2.9
Sodium (Na)	62
Potassium (K)	2.6
Iron (Fe)	.08
Manganese (Mn)	.02
Silica (SiO_2)	1.7
Sulfate (SO_4)	14
Chloride (Cl)	111
Specific Conductivity (micromhos/cm)	400
Nitrogen-Ammonia	.02
Nitrogen-Nitrate	0.1
Nitrogen-Nitrite	.001
Copper (Cu)	.04



Williams Lake and Millham Reservoir
Water Supply for Marlborough, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Millham Reservoir

Location: Marlborough, south of Robin Hill Road, east of Boundry Street.

Community Served: Marlborough

Type of Supply: Surface

Description: Surface area 67 acres, drainage area 2200 acres, storage capacity 450 mg.

Last Reported or Estimated Yield: 1.58 mgd.

Year Developed: 1893

Year Removed from Normal Service: Use was reduced in 1961 when Marlborough joined the MDC, presently used as a reserve supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination, corrosion control.

Watershed in which Supply is Located: Assabet River

Present Ownership and Use of Supply Site: Owned by the City of Marlborough and held as a reserve water supply.

Reported Water Quality Defects: Taste, odor, color, high iron content, high sodium content.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 1,146.47 mg or 3.14 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Millham Reservoir

Major Downstream Users to be Impacted by Reduced Flow: Reactivation would reduce the amount of dilution water for sewerage treatment plant discharges by Marlborough, Hudson and Maynard.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation will reduce the flow of the Assabet River.

Pollution Sources on Watershed: Runoff from roads and residential developments.

Water Quality Parameters Requiring Treatment: Turbidity, taste, odor, color and iron.

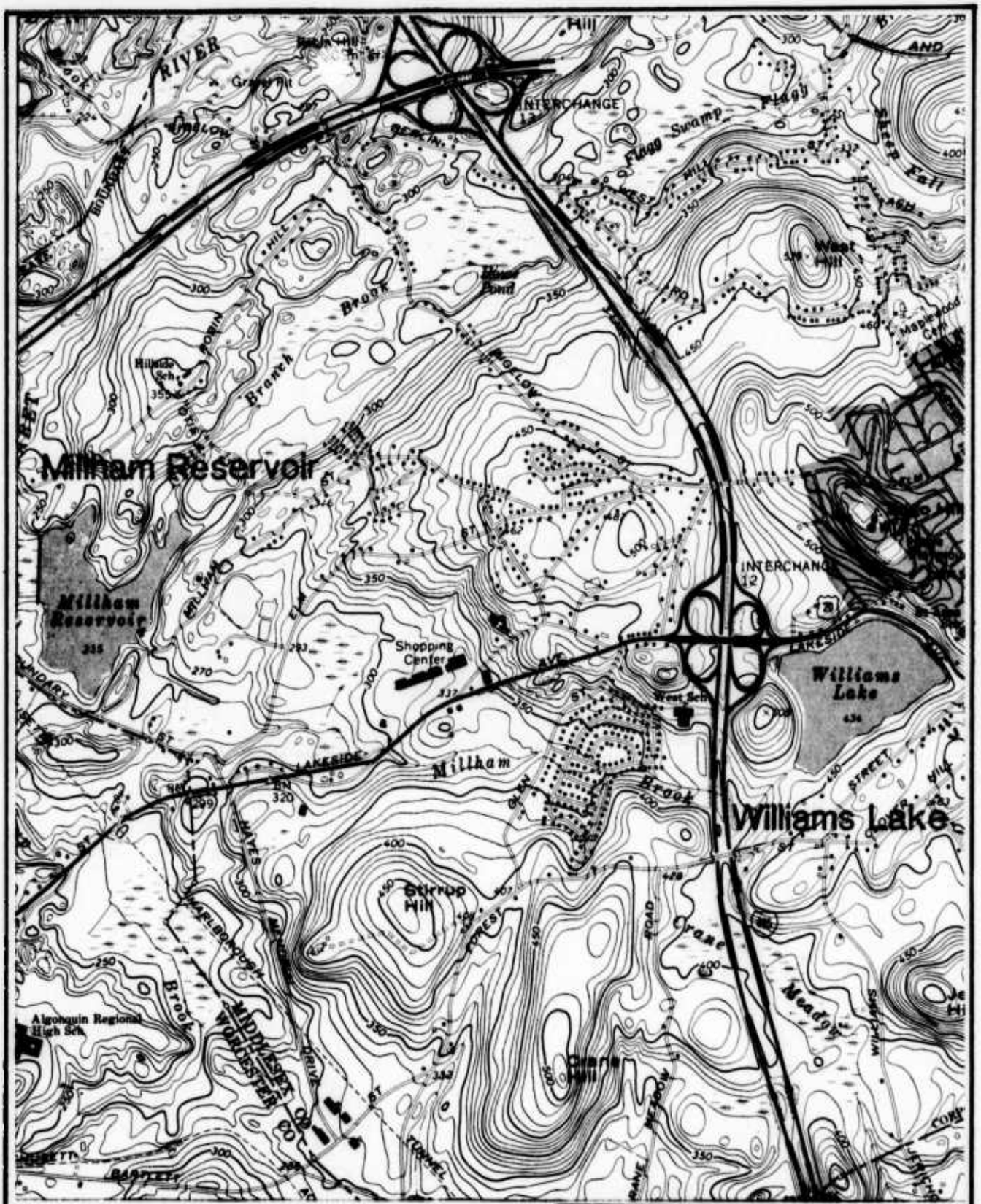
Treatment Required: Chlorination, flocculation, carbon addition, settling and filtration.

Estimated Cost of Treatment: $3,750,000 for a 2.20 mgd plant. Based on estimates made by Metcalf & Eddy, Inc., Boston, Massachusetts.

Estimated Total Cost of Reactivation: $7,250,000 including $3,500,000 for an addition to the reservoir. Based on estimates made by Metcalf & Eddy, Inc., Boston, Massachusetts.

Millham Reservoir. Water supply for Marlborough, Massachusetts. Chemical analysis of March 25, 1979. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	2.3
Sediment	0
Color	25
Odor	0
pH	6.5
Alkalinity (Total $CaCO_3$)	12
Hardness ($CaCO_3$)	42
Calcium (Ca)	13
Magnesium (Mg)	2.4
Sodium (Na)	29
Potassium (K)	2.1
Iron (Fe)	.32
Manganese (Mn)	.08
Silica (SiO_2)	4.3
Sulfate (SO_4)	14
Chloride (Cl)	52
Specific Conductivity (micromhos/cm)	210
Nitrogen-Ammonia	.04
Nitrogen-Nitrate	0.3
Nitrogen-Nitrite	.004
Copper (Cu)	.02



Williams Lake and Millham Reservoir
Water Supply for Marlborough, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Spot Pond Auxiliary Supply

Location: In Medford, north of Elm Street and south of Spot Pond, including Wrights Pond and the stream draining Wrights Pond.

Community Served: Medford

Type of Supply: Surface

Description: Wrights pond - surface area 23 acres, drainage 191 acres, storage 72 mg. Also the brook which drains Wrights Pond.

Last Reported or Estimated Yield: .22 mgd.

Year Developed: 1883

Year Removed from Normal Service: 1898

Reason for Removal from Service: Poor water quality. Medford joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Mystic River

Present Ownership and Use of Supply Site: Wrights Pond is owned by the City of Medford and is used for swimming. The brook draining Wright Pond is partially owned by the City of Medford and used for recreation and partially a privately owned residential area.

Reported Water Quality Defects: Odor, taste and color.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 3,348.08 mg or 9.17 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Spot Pond Auxiliary Supply

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply:
Reactivation could reduce the flow of the Mystic River.

Pollution Sources on Watershed: Runoff from roads.

Water Quality Parameters Requiring Treatment: Color, odor, and taste.

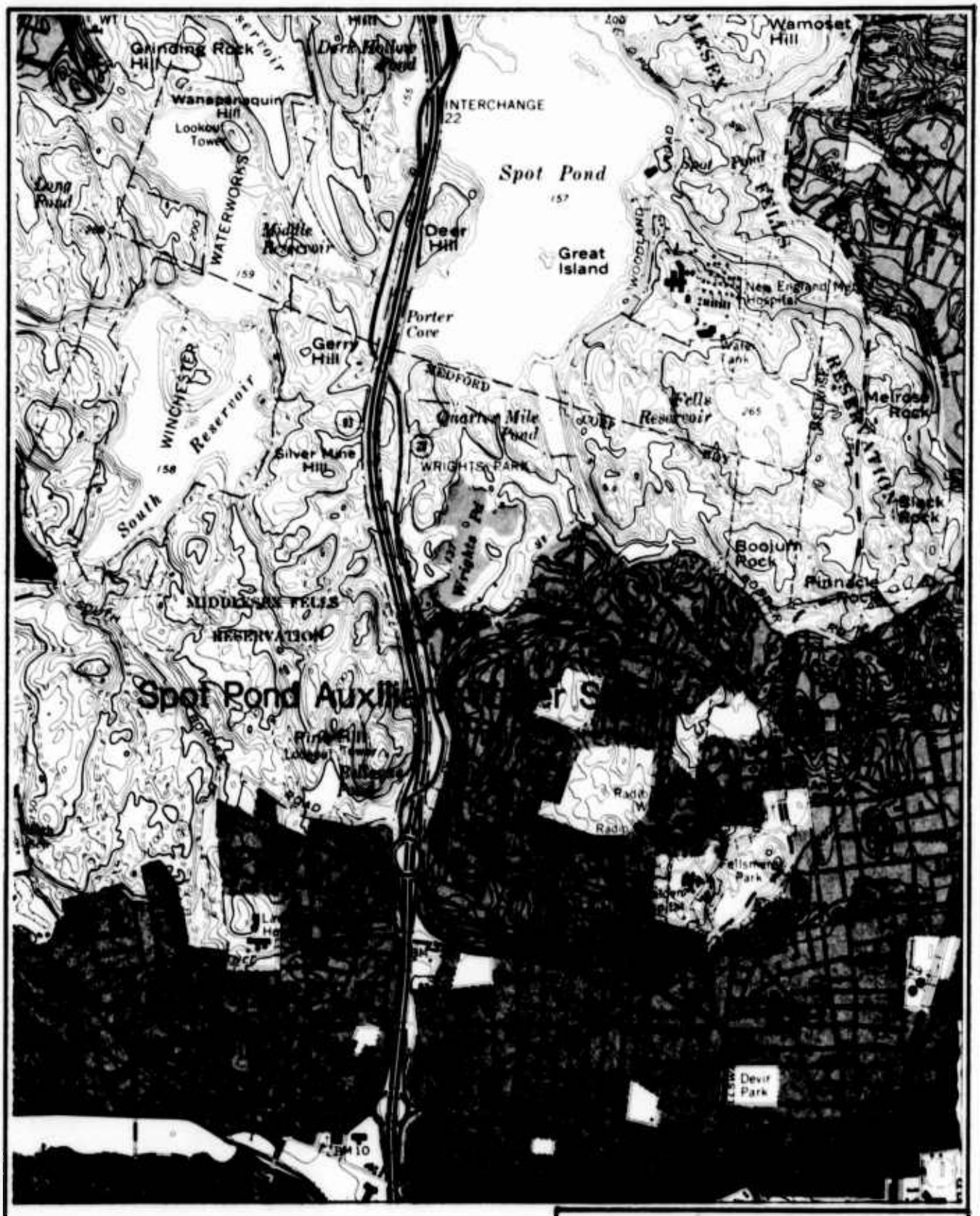
Treatment Required: Chlorination, coagulation, sedimentation, and filtration.

Estimated Cost of Treatment: $620,000 for a .45 mgd treatment plant.

Estimated Total Cost of Reactivation:
$660,000 including $40,000 for a new pumping station.

Spot Pond Auxiliary Supply. Water supply for Medford, Massachusetts. Chemical analysis for 1898. Data from the Massachusetts State Board of Health Annual Report of 1898. Chemical values in parts per 100,000.

Number of Samples	2
Color	.41
Residue on Evaporation	
Total	4.48
Loss on Ignition	1.90
Free Ammonia	.0087
Albuminoid Ammonia	
Total	.0339
Dissolved	.0261
Suspended	.0078
Chlorine	.33
Nitrogen as Nitrates	.0020
Nitrogen as Nitrites	.0001
Oxygen Consumed	.71
Hardness	2.1



Spot Pond Auxiliary Supply
Water Supply for Medford, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Spot Pond Wells

Location: In Melrose, at Conant Playground-north of Wyoming Avenue, south of Prospect Street on Stoneham line.

Community Served: Melrose

Type of Supply: Groundwater

Description: Fifteen 2½ inch tubular wells, 35 to 45 feet deep.

Last Reported or Estimated Yield: .28 mgd.

Year Developed: 1893

Year Removed from Normal Service: 1896

Reason for Removal from Service: Melrose joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Spot Pond-Mystic River

Present Ownership and Use of Supply Site: Owned by City of Melrose. The area is a park containing a playground and a baseball field.

Reported Water Quality Defects: Hardness

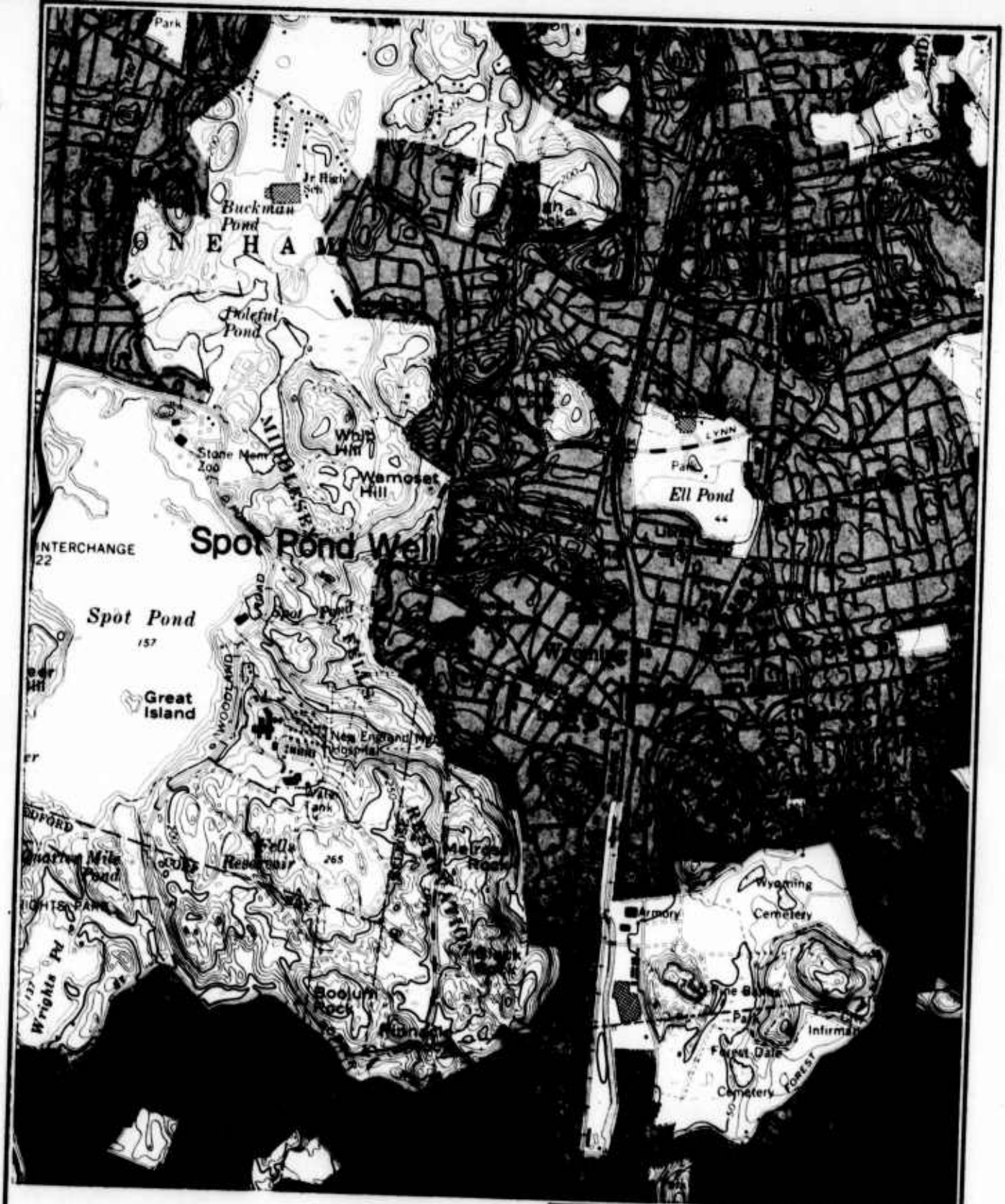
Feasibility of Reactivation: Unfeasible-reactivation would require the removal of several private homes and a large apartment complex.

1978 MDC Water Use by Community: 1,120.18 mg or 3.07 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Spot Pond Wells. Water supply for Melrose, Massachusetts. Chemical analysis of Feb. 4, 1896. Data from the Massachusetts State Board of Health Annual Report of 1896. Chemical values in parts per 100,000.

Turbidity	None
Sediment	Slight
Color	.02
Residue on Evaporation	14.50
Free Ammonia	.0000
Albuminoid Ammonia	.0038
Chlorine	1.34
Nitrogen as Nitrates	.0920
Nitrogen as Nitrites	.0002
Oxygen Consumed	.09
Hardness	6.7
Iron	.0050



Spot Pond Wells
Water Supply for Melrose, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Hyde Park Water Company

Location: In Hyde Park, west of the Truman Highway along the Neponset River and north of Milton Street along Mother Brook in Dedham.

Community Served: Milton

Type of Supply: Groundwater

Description: Two-hundred 2½ inch tubular wells, 25 to 40 feet deep and six, 6 inch by 40 feet wells along the Neponset River. Also 21 tubular wells, an average of 21 feet deep along Mother Brook.

Last Reported or Estimated Yield: .73 mgd.

Year Developed: From 1885 to 1900.

Year Removed from Normal Service: Approximately 1911.

Reason for Removal from Service: Poor water quality. Neponset River highly polluted-pollution reached wells.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Neponset River

Present Ownership and Use of Supply Site: Hyde Park site includes privately owned commercial and industrial areas. Dedham site contains private residential, commercial and light industrial establishments as well as the Dedham Public Works Department Yard.

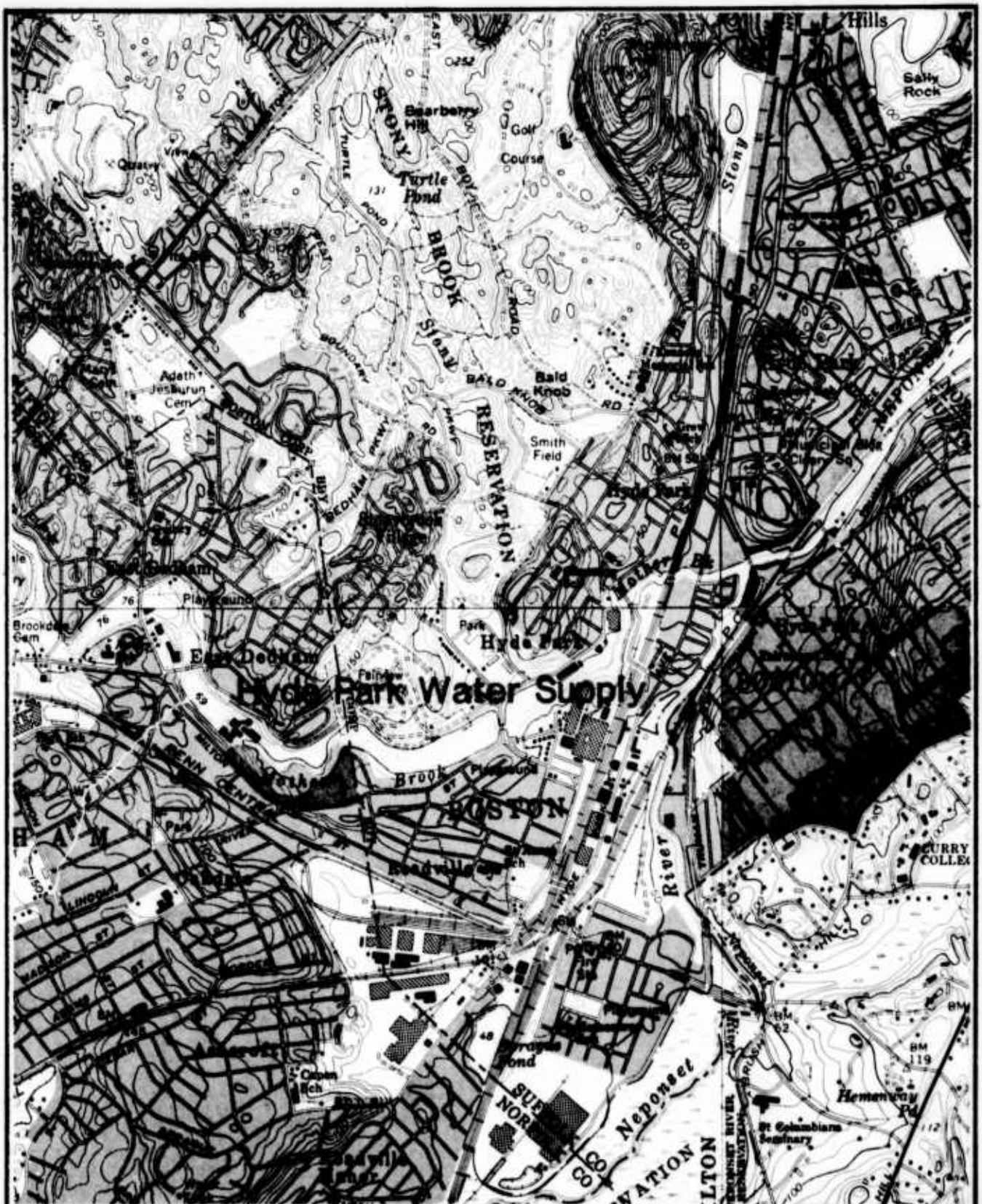
Reported Water Quality Defects: High iron content, bad taste and odor.

Feasibility of Reactivation: Unfeasible-would require a major relocation of surface features.

1978 MDC Water Use by Community: 1,230.21 mg or 3.37 mgd.

Hyde Park Water Company. Water supply for Milton, Massachusetts Average chemical analysis for 1911. Data from the Massachusetts State Board of Health Annual Report of 1911. Chemical values in parts per 100,000.

	Neponset River Wells	Mother Brook Wells
Color	.19	.16
Residue on Evaporation	16.61	11.04
Free Ammonia	.0252	.0010
Albuminoid Ammonia	.0053	.0080
Chlorine	2.49	1.20
Nitrogen as Nitrates	.0585	.1454
Nitrogen as Nitrites	.0002	.0000
Hardness	6.5	4.2
Iron	.0801	.0064



Hyde Park Water Company
Water Supply for Milton and Hyde Park, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Dedham Avenue Supply

Location: In Needham north of Dedham Avenue between the Charles River and the Penn Central Railroads tracks.

Community Served: Needham

Type of Supply: Surface and Groundwater

Description: Two dug wells, a reservoir to recharge the wells covering 9 acres with a storage capacity of 9 mg, a small spring (Hicks Spring) diverted into the dug wells and 38 tubular wells along the Charles River (Coburn Lot).

Last Reported or Estimated Yield: Dug wells .43 mgd. Total .94 mgd.

Year Developed: From 1890 to 1924.

Year Removed from Normal Service: Tubular about 1935, spring 1964, dug wells in reserve since 1971.

Reason for Removal from Service: Supply no longer needed by community.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: Site of spring is now a park owned by the town of Needham. Site of tubular wells is now occupied by private single family homes. Site of reservoir and dug wells owned by Needham DPW.

Reported Water Quality Defects: Sodium above 20 ppm in 1971 tests.

Feasibility of Reactivation: Potentially feasible - dug wells could be reactivited.

1978 MDC Water Use by Community: 364.37 mg or .99 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Dedham Avenue Supply

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply:
Public will have to be notified that sodium levels are above 20 mg/l. Reactivation could have an adverse impact upon the Charles River, particularly during periods of low flow.

Pollution Sources on Watershed: Golf course immediately north of the wells and residential developments on upper part of watershed.

Water Quality Parameters Requiring Treatment: None

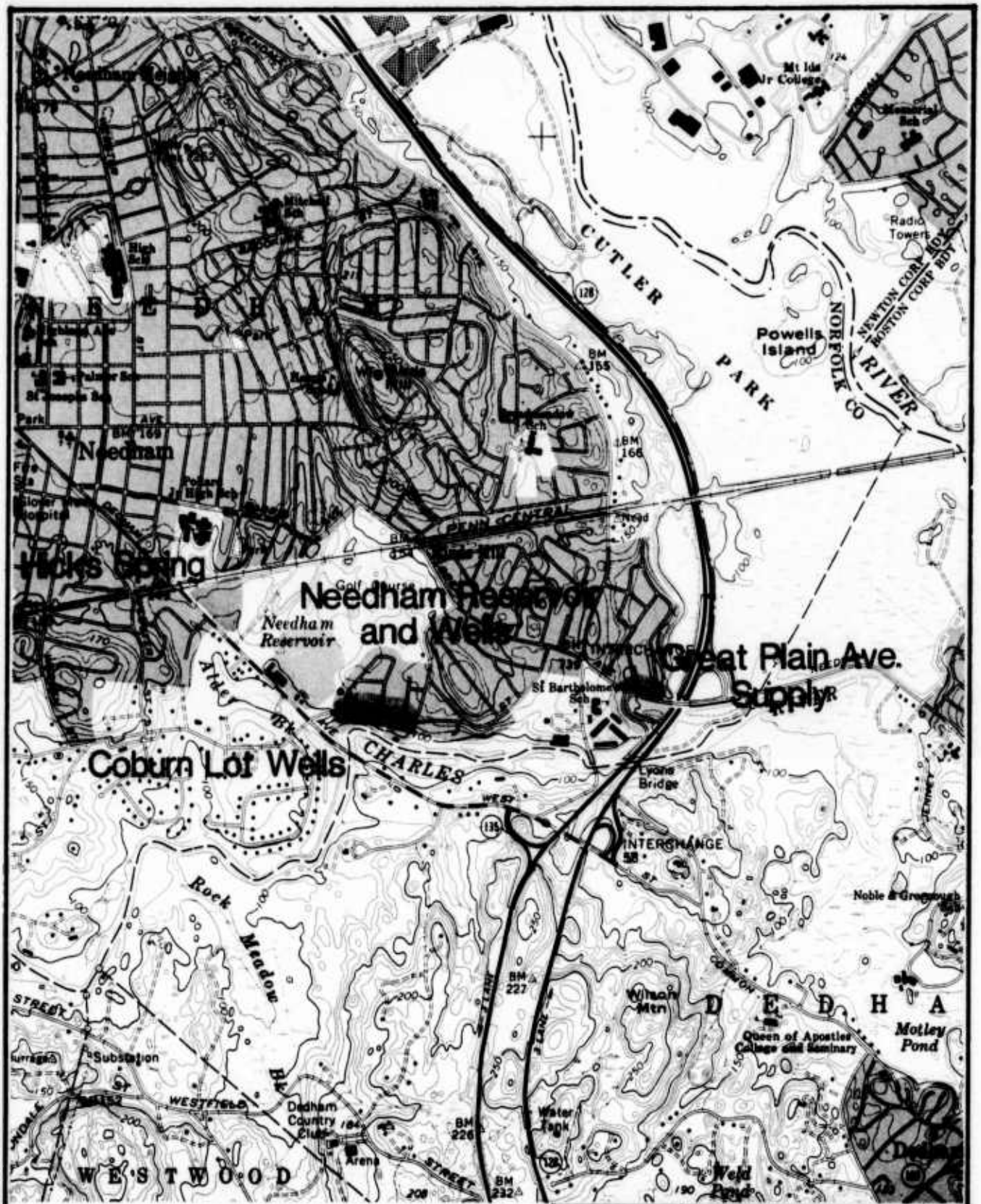
Treatment Required: Chlorination

Estimated Cost of Treatment: $75,000 for chlorination only.

Estimated Total Cost of Reactivation:
$100,000 including $25,000 for a new pump, motor and controls.

Dedham Avenue Supply. Water supply for Needham, Massachusetts. Average chemical analysis for 1971. Data from Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Number of Samples	3
Turbidity	0
Sediment	0
Color	0
Odor	0
pH	6.3
Alkalinity	16
Hardness	74
Iron	.01
Manganese	.00
Free Ammonia Nitrogen	.02
Nitrite Nitrogen	.001
Nitrate Nitrogen	4.7
Chloride	51
Sodium	22



Dedham Ave. and Great Plain Ave. Supplies
Water Supplies for Needham, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Great Plain Avenue Supply

Location: In Needham-at junction of Rt. 128 and Great Plain Avenue (Interchange 57).

Community Served: Needham

Type of Supply: Groundwater

Description: Fifty 2½ inch tubular wells, 25-30 feet deep.

Last Reported or Estimated Yield: 1.0 mgd.

Year Developed: Between 1930 and 1935.

Year Removed from Normal Service: 1946

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: Owned by Massachusetts Public Works Department. The site is part of Interchange 57 of Route 128.

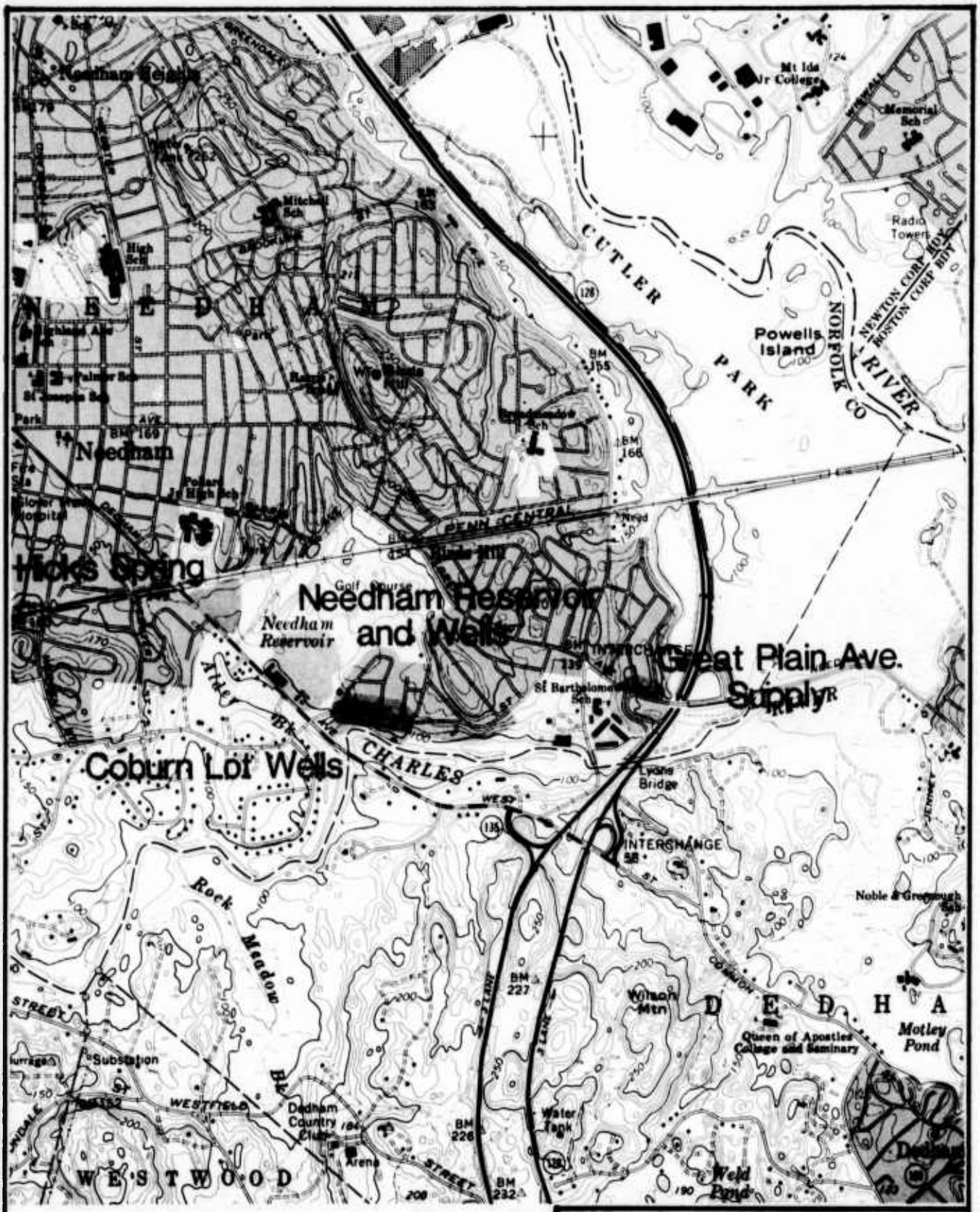
Reported Water Quality Defects: Bad taste and odor.

Feasibility of Reactivation: Unfeasible-would require major restructuring of interchange.

1978 MDC Water Use by Community: 364.37 mg or .99 mgd.

Great Plain Avenue Supply. Water supply for Needham, Massachusetts Average chemcial analysis for 1945. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	5
Color	4
Free Ammonia	.002
Albuminoid Ammonia	.017
Nitrates	1.10
Nitrites	.000
Chlorides	9.9
Hardness	38
Alkalinity	69
Iron	.15
pH	6.5



Dedham Ave. and Great Plain Ave. Supplies
Water Supplies for Needham, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Newton Water Works Reservation

Location: In Needham and Newton along the Charles River from Needham Street south to the Dedham line.

Community Served: Newton

Type of Supply: Groundwater

Description: 677.5 acre reservation containing an infiltration basin, 4 dug wells and 300 to 400 tubular wells.

Last Reported or Estimated Yield: 8.0 mgd maximum.

Year Developed: Between 1875 and 1938.

Year Removed from Normal Service: 1953

Reason for Removal from Service: Inadequate yield and need to upgrade equipment.

Treatment Prior to Removal from Service: Chlorination, ammoniation.

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: Most of site is now owned by the MDC and comprises Cutler Park. The western edge of the reservation is now the site of Route 128 and the northern part is now a privately owned industrial area.

Reported Water Quality Defects: Taste, odor and color.

Feasibility of Reactivation: Potentially feasible to reactivate the section of site within Culter Park.

1978 MDC Water Use by Community: 4,161.64 mg or 11.40 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Newton Water Works Reservation

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could have an adverse impact upon the Charles River, particularly during periods of low flow. Minimum flows each year are generally less than 8 mgd.

Pollution Sources on Watershed: The watershed is heavily developed with highways, industry, commercial properties and residential neighborhoods.

Water Quality Parameters Requiring Treatment: Color, taste, and odor.

Treatment Required: Chlorination, coagulation, sedimentation, and filtration.

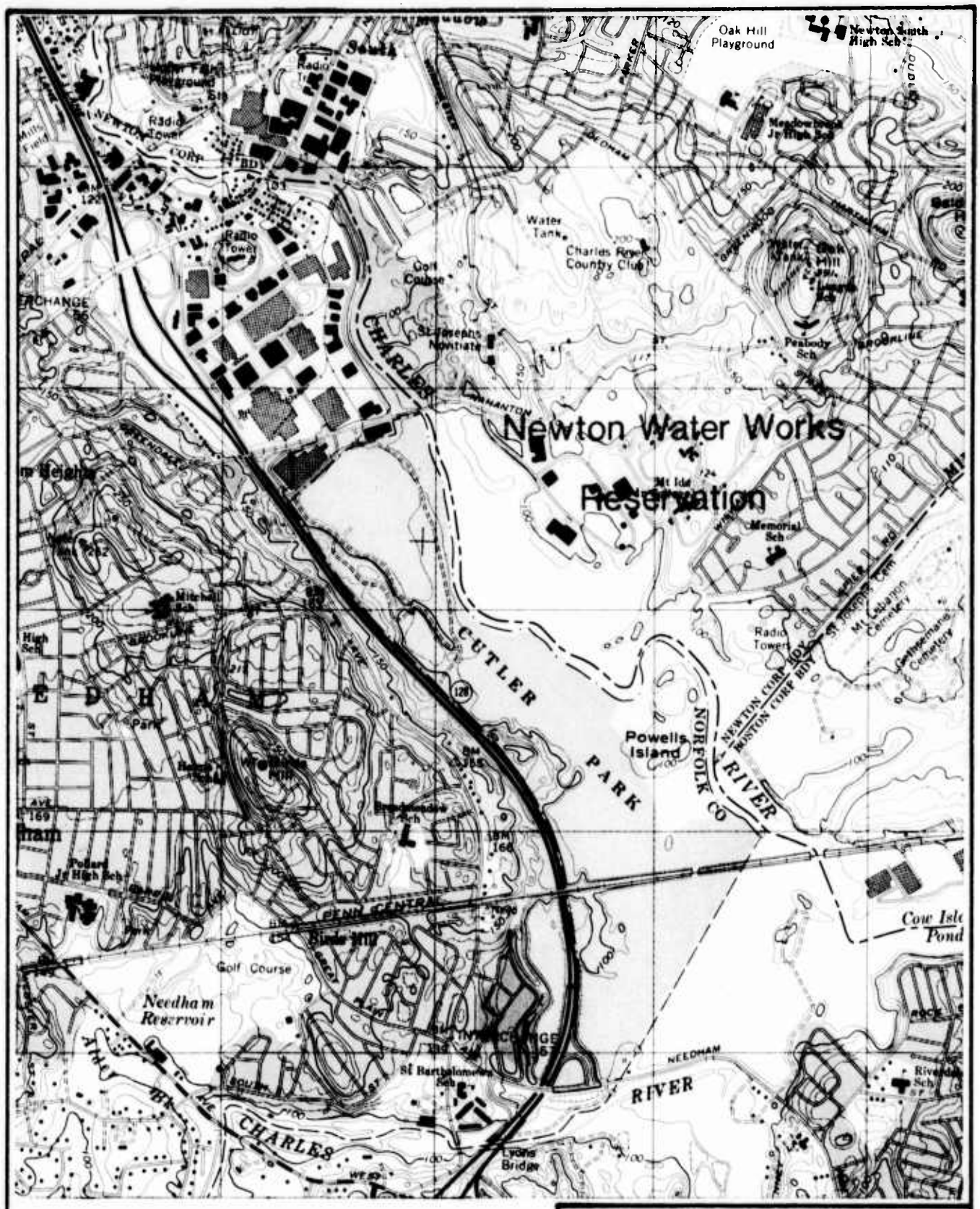
Estimated Cost of Treatment: $6,800,000 for a 8.00 mgd treatment plant.

Estimated Total Cost of Reactivation:

$7,800,000 including $1,000,000 for new wells, pumps and mains.

Newton Water Works Reservation. Water supply for Newton, Massachuset Average chemical analysis for 1953. Data from the Massachusetts Dept. of Environmental Quality Engineering. Chemical values in parts per million.

	Dug Well Number 1	Dug Well Number 2	Dug Well Number 3	Dug Well Number 4
Number of Samples	3	3	4	2
Color	3	3	3	2
Nitrates	.50	.25	.15	—
Chlorides	11.0	13.1	10.9	11.0
Hardness	52	49	44	52
Alkalinity	33	33	31	37
Iron	.04	.03	.02	.02
pH	6.4	6.4	6.3	6.3



Newton Water Works Reservation
Water Supply for Newton, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Cold Harbor Brook Reservoir

Location: In Shrewsbury, south of Route 290, on Reservoir Road.

Community Served: Northborough

Type of Supply: Surface

Description: Reservoir with a 9 acre surface area. A 1.536 acre drainage area and a useable storage capacity of 12 mg.

Last Reported or Estimated Yield: .18 mgd.

Year Developed: 1883

Year Removed from Normal Service: About 1966

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination, coagulation, slow sand filtration.

Watershed in which Supply is Located: Assabet River

Present Ownership and Use of Supply Site: Owned by Town of Northborough, not now in use.

Reported Water Quality Defects: Color, taste, odor and iron.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 7.38 mg or .02 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Cold Harbor Brook Reservoir

Major Downstream Users to be Impacted by Reduced Flow: None - wastewater would be returned to watershed.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: Septic systems from houses along Rawson Hill Brook and runoff from Route 290 and Interchange 23 of Route 290.

Water Quality Parameters Requiring Treatment: Color, taste, odor and iron.

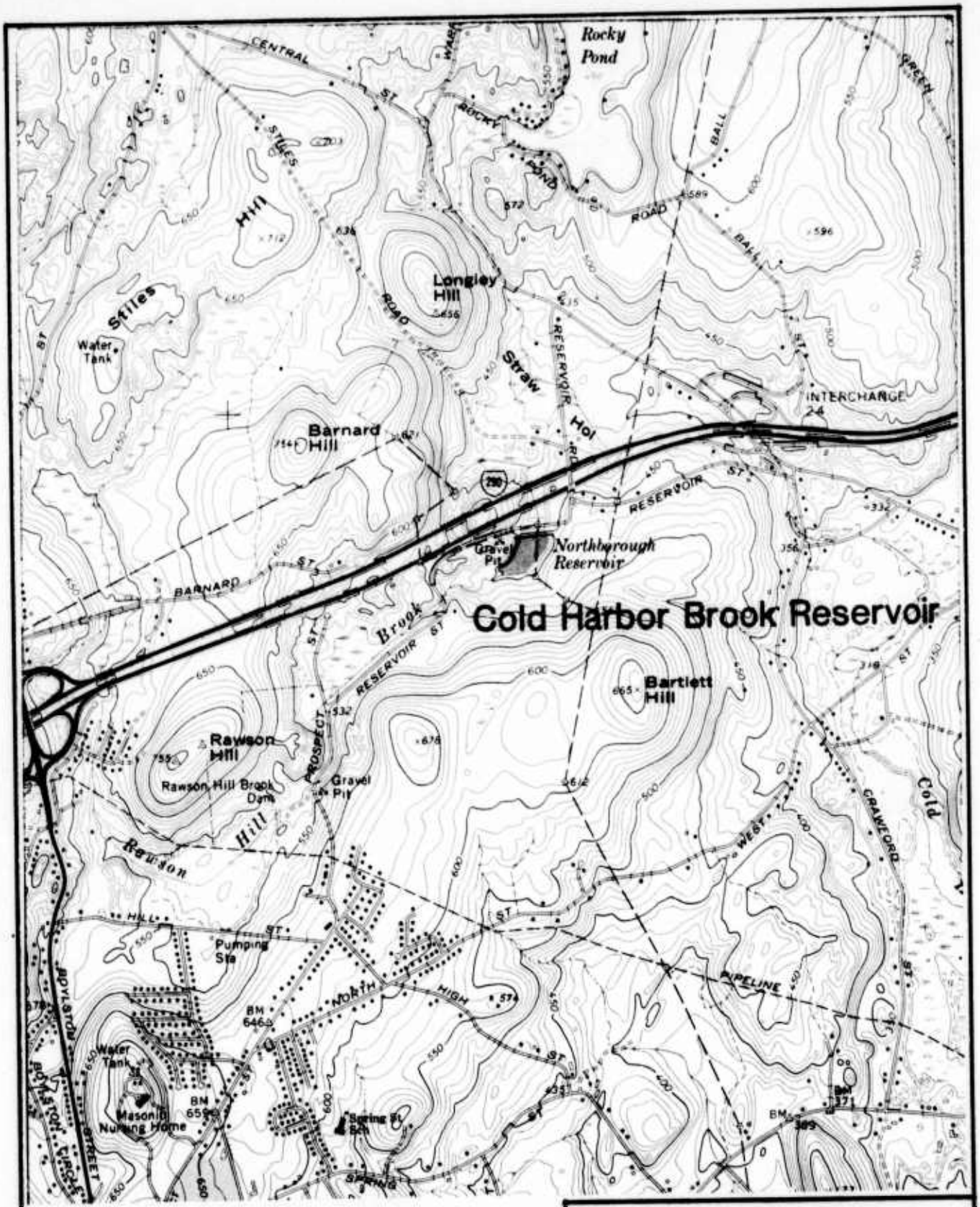
Treatment Required: Chlorination, coagulation, sedimentation, and filtration.

Estimated Cost of Treatment: $520,000 for a .36 mgd treatment plant.

Estimated Total Cost of Reactivation: $600,000 including $80,000 to rehabilitate pumping equipment and to clean the reservoir.

Cold Harbor Brook Reservoir. Water supply for Northborough, Massachusetts. Average chemical analysis for 1968 and analysis of March 24, 1969. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

	Average for 1968	March 24, 1969
Number of Samples	3	1
Turbidity	3	4
Sediment	1	0
Color	115	45
Odor	1Ep	0
pH	6.6	6.6
Alkalinity	13	5
Hardness	18	74
Iron	.73	.24
Manganese	.03	.02
Free Ammonia Nitrogen	.18	.18
Nitrite Nitrogen	.001	.001
Nitrate Nitrogen	0.3	0.6
Chloride	10.0	8.0
Fluoride	—	0.1



Cold Harbor Brook Reservoir
Water Supply for Northborough, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Buckmaster Pond

Location: In Westwood, southeast of Route 109, north of Pond Street.

Community Served: Norwood

Type of Supply: Groundwater

Description: Well in reservoir with a surface area of 29.5 acres, a drainage area of 250 acres and a storage capacity of 123 mg.

Last Reported or Estimated Yield: 1.50 mgd.

Year Developed: 1885

Year Removed from Normal Service: Approximately 1957, now a reserve supply.

Reason for Removal from Service: Norwood joined the MDC.

Treatment Prior to Removal from Service: Chlorination and slow sand filtration.

Watershed in which Supply is Located: Neponset River

Present Ownership and Use of Supply Site: Owned by Conservation Commission of Westwood, used as a park, water rights owned by Norwood.

Reported Water Quality Defects: Color, turbidity, iron, sodium trichloroethyline and trichloroethane.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 1,498.67 mg or 4.11 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Buckmaster Pond

Major Downstream Users to be Impacted by Reduced Flow: The Dedham Water Company has wells downstream along the Neponset River.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation could have an adverse impact upon the Neponset River during periods of low flow.

Pollution Sources on Watershed: Residential developments surrounding pond.

Water Quality Parameters Requiring Treatment: Turbidity, color, iron trichloroethyline and trichloroethane.

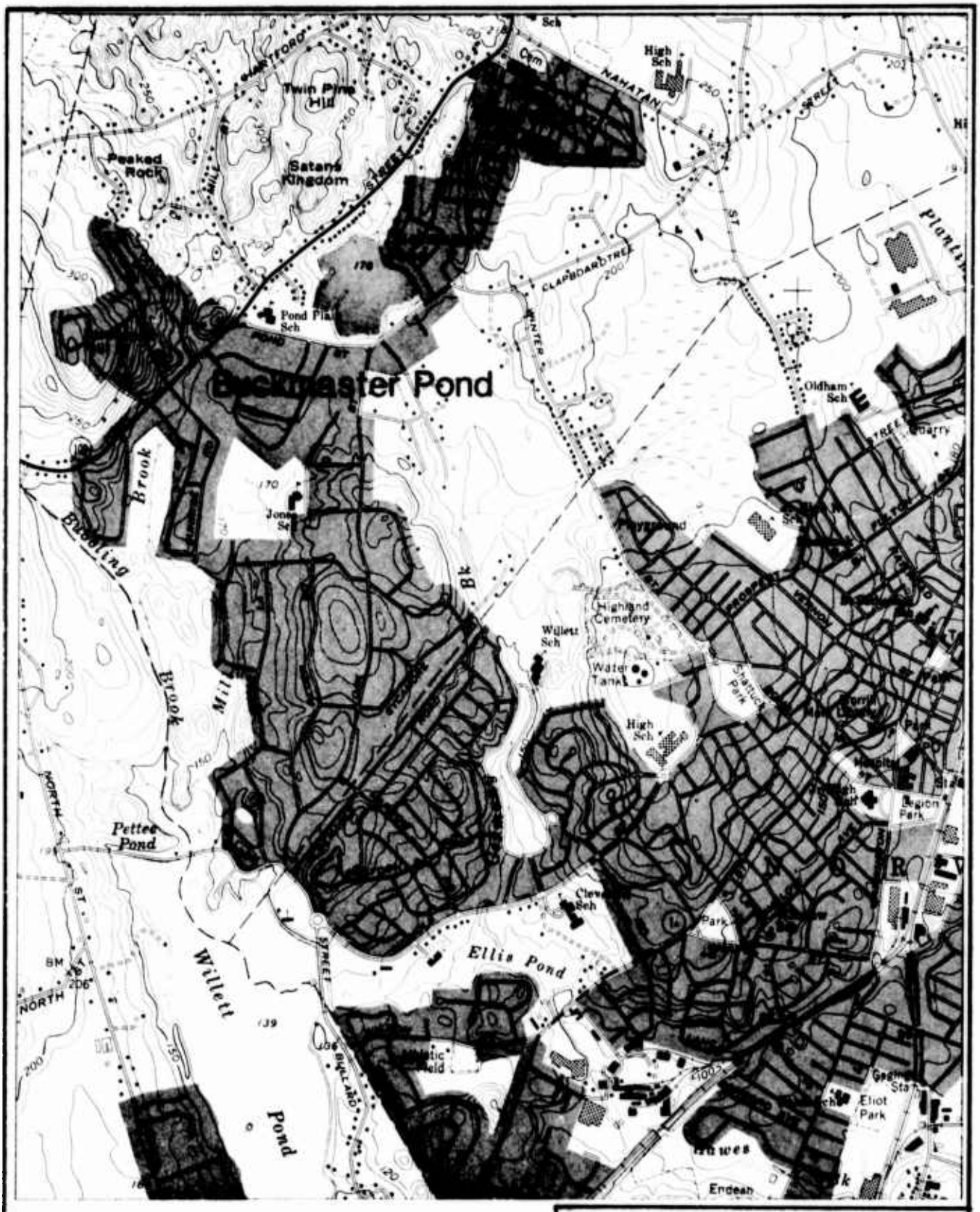
Treatment Required: Chlorination, iron removal and activated carbon.

Estimated Cost of Treatment: $870,000 for a 1.50 mgd plant. Estimate by Fay, Spofford & Thorndike, Inc., Boston, Massachusetts.

Estimated Total Cost of Reactivation: $1,000,000 including $130,000 for modification of well and new pumping equipment. Estimate by Fay, Spofford, & Thorndike, Inc., Boston, Massachusetts.

Buckmaster Pond. Water supply for Norwood, Massachusetts. Chemical analysis of February 8, 1975. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter

Turbidity	11
Sediment	0
Color	40
Odor	0
pH	7.3
Alkalinity (Total $CaCO_3$)	54
Hardness ($CaCO_3$)	80
Calcium (Ca)	27
Magnesium (Mg)	3.2
Sodium (Na)	60
Potassium (K)	2.5
Iron (Fe)	1.5
Manganese (Mn)	.13
Silica (SiO_2)	7.3
Sulfate (SO_4)	22
Chloride (Cl)	76
Specific Conductivity (microhmos/cm)	360
Nitrogen as Ammonia	.02
Nitrogen as Nitrate	0.5
Nitrogen as Nitrite	.017
Copper (Cu)	.00



Buckmaster Pond
Water Supply for Norwood, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Ellis Station Supply

Location: In Norwood, southeast of Route 1, 2,000 ft. south of the Westwood line.

Community Served: Norwood

Type of Supply: Groundwater

Description: Two gravel packed wells, 8 inches in diameter and 59 feet deep, and 133, 2½ inch tubular wells, 28 to 45 feet deep.

Last Reported or Estimated Yield: 2.5 mgd.

Year Developed: 1900 to 1921

Year Removed from Normal Service: 1957

Reason for Removal from Service: Norwood joined the MDC.

Treatment Prior to Removal from Service: Aeration, filtration, pH adjustment.

Watershed in which Supply is Located: Purgatory Brook - Neponset River

Present Ownership and Use of Supply Site: Owned by Town of Norwood not used for any specific purpose at this time. Local residents use the area for picnicking.

Reported Water Quality Defects: Color, iron, manganese, trichloroethyline and trichloroethane.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 1,498.67 mg or 4.11 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Ellis Station Supply

Major Downstream Users to be Impacted by Reduced Flow: The Dedham Water Company has wells downstream along the Neponset River.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could have an adverse impact upon the Neponset River during periods of low flow.

Pollution Sources on Watershed: Runoff from Route 1 and from residential, commercial and industrial developments.

Water Quality Parameters Requiring Treatment: Color, iron, manganese, trichloroethyline and trichloroethane.

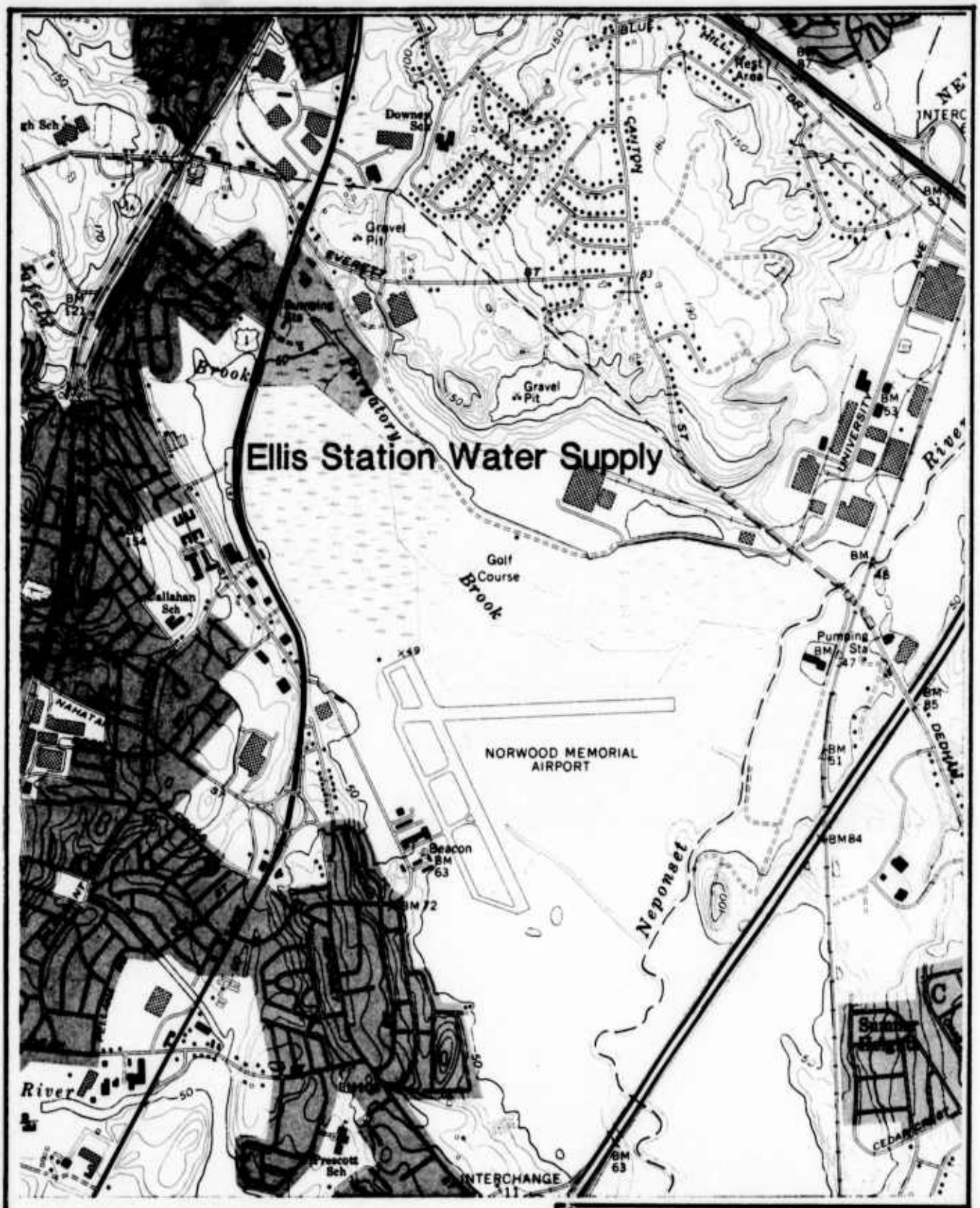
Treatment Required: Chlorination, iron and manganese removal and activated carbon.

Estimated Cost of Treatment: $2,165,000 for a 2.50 mgd plant. Estimate by Fay, Spofford & Thorndike, Inc., Boston, Massachusetts.

Estimated Total Cost of Reactivation: $2,710,000 including $545,000 for new wells and pump stations. Estimate by Fay, Spofford & Thorndike, Inc., Boston, Massachusetts.

Ellis Station Supply. Water supply for Norwood, Massachusetts. Chemical analysis of Feb. 23, 1970. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	1
Sediment	0
Color	18
Odor	0
pH	7.5
Alkalinity	4
Hardness	20
Iron	.30
Manganese	.00
Free Ammonia Nitrogen	.50
Nitrite Nitrogen	.000
Nitrate Nitrogen	0.2
Chloride	8.0



Ellis Station Supply
Water Supply for Norwood, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Pine Street and Johnson Street Wells

Location: In Peabody, west of Johnson Street south of Methodist Church and south of Pine Street across from Kennedy Jr. High School.

Community Served: Peabody

Type of Supply: Groundwater

Description: Two gravel packed wells. Pine Street Well 18 inches in diameter by 50.5 feet deep. Johnson Street Well 18 inches in diameter by 54.5 feet deep.

Last Reported or Estimated Yield: 1.20 mgd.

Year Developed: Pine Street in 1957, Johnson Street in 1962.

Year Removed from Normal Service: About 1973, now a reserve water supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Ipswich River

Present Ownership and Use of Supply Site: Owned by Town of Peabody, used as a reserve water supply.

Reported Water Quality Defects: Turbidity, color, manganese, iron, sodium and hardness.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 281.10 mg or .77 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Pine Street and Johnson Street Wells

Major Downstream Users to be Impacted by Reduced Flow: Salem and Beverly use water from the Ipswich River. Danvers, Middleton, Hamilton, Topsfield and Ipswich have wells along the river.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation could have an adverse impact upon the Ipswich River, particularly during times of low flow. Low flows are less than 1.2 mgd.

Pollution Sources on Watershed: Runoff from roads and residential areas.

Water Quality Parameters Requiring Treatment: Turbidity, color, manganese and iron.

Treatment Required: Chlorination, coagulation, sedimentation and filtration.

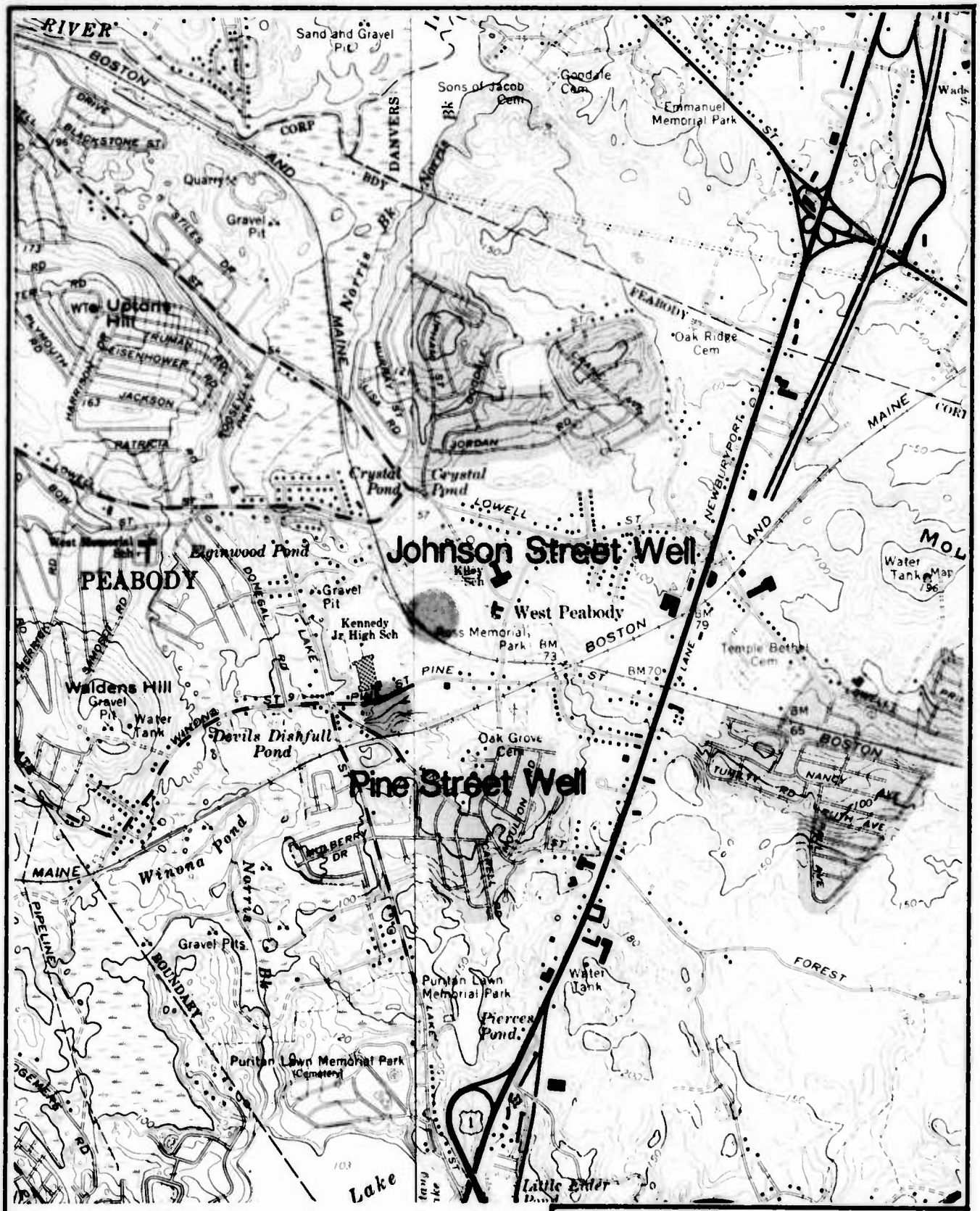
Estimated Cost of Treatment: $1,400,000 for a 1.2 mgd treatment plant.

Estimated Total Cost of Reactivation:

$1,530,000 including $130,000 for new mains and a pump station.

Pine Street and Johnson Street Wells. Water supply for Peabody, Massachusetts. Chemical analysis of November 2, 1978. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

	Pine Street Well	Johnson Street Well
Turbidity	0.2	3.5
Sediment	0	0
Color	0	23
Odor	0	0
pH	6.6	6.9
Alkalinity ($CaCO_3$)	55	70
Hardness ($CaCO_3$)	104	178
Calcium (Ca)	25	50
Magnesium (Mg)	10	13
Sodium (Na)	25	42
Potassium (K)	2.0	2.5
Iron (Fe)	.00	.80
Manganese (Mn)	.40	1.5
Silica (SiO_2)	13	15
Sulfate (SO_4)	21	22
Chloride (Cl)	53	110
Specific Conductivity (microhmos/cm)	320	540
Nitrogen as Ammonia	.00	.14
Nitrogen as Nitrates	1.1	0.2
Nitrogen as Nitrites	.006	.000
Copper (Cu)	.03	.05



Pine and Johnson Street Wells
Water Supply for Peabody, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Cedar Pond

Location: In Peabody, southern end of town, just east of Interchange 30 of Route 128.

Community Served: Peabody

Type of Supply: Surface and Groundwater

Description: Tubular wells in valley just below Cedar Pond. Cedar Pond surface area 12 acres, drainage area 973 acres, available storage capacity 5 mg.

Last Reported or Estimated Yield: 1.80 mg from wells in 1978.

Year Developed: Wells 1912. Surface 1915.

Year Removed from Normal Service: Wells 1915. Surface supply used as an emergency supply until 1938. Now an industrial supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Iron removal.

Watershed in which Supply is Located: Goldthwait Brook-North River

Present Ownership and Use of Supply Site: Owned by Eastman Gelatine Corp. and used as an industrial water supply taken by means of wells in valley below pond. Supply site is also a wildlife reserve and is used for recreational purposes such as hiking and birdwatching.

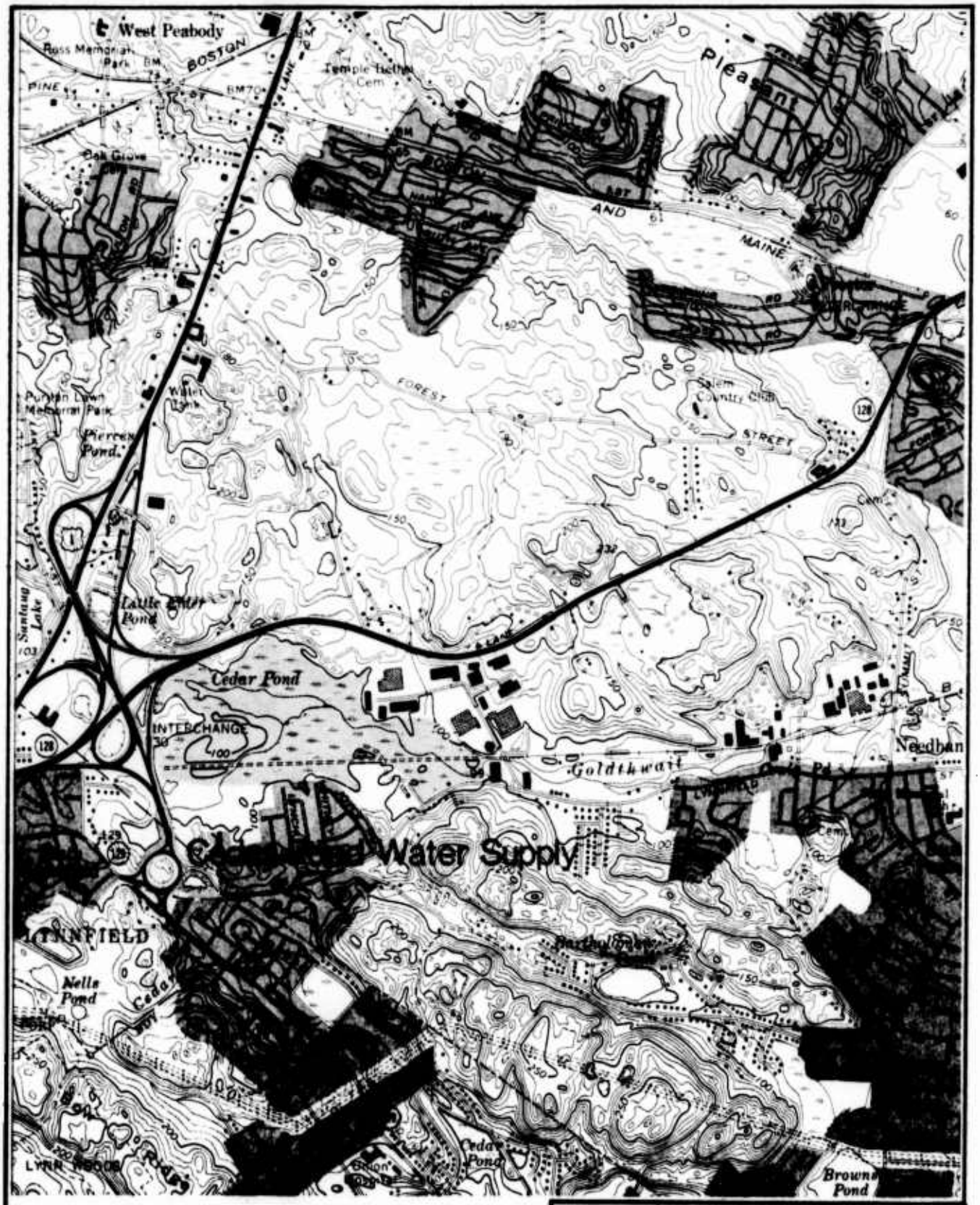
Reported Water Quality Defects: Iron (5-6 ppm) and chlorides (about 2000 ppm) according to Eastman Gelatine Corp.

Feasibility of Reactivation: Unfeasible-Supply is presently in use for industrial purposes.

1978 MDC Water Use by Community: 281.10 mg or .77 mgd.

Cedar Pond. Water supply for Peabody, Massachusetts. Chemical analysis of April 13, 1922. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per 100,000.

Turbidity	1
Sediment	2
Color	.82
Residue on Evaporation	
Total	6.40
Loss on Ignition	3.25
Free Ammonia	.0020
Albuminoid Ammonia	
Total	.0208
Dissolved	.0126
Suspended	.0082
Chlorine	.50
Hardness	2.1
Iron	.035



Cedar Pond
Water Supply for Peabody, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Penn Street Wells

Location: In Quincy, on east side of Penn Street approximately 600 feet south of junction of Penn Street and Columbia Street.

Community Served: Quincy

Type of Supply: Groundwater and Surface

Description: Two large dug wells, one 30 feet in diameter by 22 feet deep, the other 32 feet in diameter and 27 feet deep. Also a filter gallery along Town Brook. Water used directly from brook in summer.

Last Reported or Estimated Yield: .45 mgd.

Year Developed: 1884 (by Quincy Water Company)

Year Removed from Normal Service: 1897

Reason for Removal from Service: Quincy joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Town Brook-Weymouth Fore River

Present Ownership and Use of Supply Site: Under private ownership by various industrial firms. The site is now an industrial park.

Reported Water Quality Defects: None

Feasibility of Reactivation: Unfeasible-would require an extensive relocation of existing surface structures.

1978 MDC Water Use by Community: 4,208.49 mg or 11.53 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Penn Street Wells. Water supply for Quincy, Massachusetts. Chemical analysis of March 9, 1889. Data from the Massachusetts State Board of Health Annual Report of 1889. Chemical values in parts per 100,000.

Turbidity	Slight
Sediment	Very Slight
Color	.50
Residue on Evaporation	
Total	1.35
Loss on Ignition	3.10
Free Ammonia	.0004
Albuminoid Ammonia	.0194
Chlorine	.59
Nitrogen as Nitrates	.0200
Nitrogen as Nitrites	.0002

Penn Street Wells
Water Supply for Quincy, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Old Quincy Reservoir

Location: In Braintree, south of junction of Rt. 128 and the Southeast Expressway.

Community Served: Quincy

Type of Supply: Surface

Description: Reservoir with a surface area of 46 acres, a drainage area of 992 acres and a storage capacity of 188 mg.

Last Reported or Estimated Yield: 1.0 mgd. (Est. by General Dynamics)

Year Developed: 1888

Year Removed from Normal Service: About 1899. Now an industrial supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Slow sand filtration.

Watershed in which Supply is Located: Town Brook-Weymouth Fore River

Present Ownership and Use of Supply Site: Owned by the City of Quincy and used by General Dynamics in Quincy as a water supply for industrial purposes.

Reported Water Quality Defects: Color

Feasibility of Reactivation: Unfeasible-presently being used for industrial purposes.

1978 MDC Water Use by Community: 4,208.49 mg or 11.53 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Old Quincy Reservoir. Water supply for Quincy, Massachusetts. Average chemical analysis for 1898. Data from the Massachsuetts State Board of Health Annual Report of 1898. Chemical values in parts per 100,000.

Number of Samples	12
Color	0.61
Residue on Evaporation	
Total	3.98
Loss on Ignition	1.55
Free Ammonia	.0042
Albuminoid Ammonia	
Total	.0226
Dissolved	.0181
Suspended	.0054
Chlorine	.64
Nitrogen as Nitrates	.0068
Nitrogen as Nitrites	.0001
Oxygen Consumed	.53
Hardness	0.8

Old Quincy Reservoir
Water Supply for Quincy, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Revere Water Works

Location: In Revere, east of Broadway and south of Mountain Road.

Community Served: Revere and Winthrop

Type of Supply: Groundwater

Description: Two dug wells, one 30 feet in diameter by 20 feet deep, the other 40 feet in diameter by 20 feet deep. Also 3 groups of tubular wells.

Last Reported or Estimated Yield: .30 mgd.

Year Developed: 1884 (by Revere Water Company)

Year Removed from Normal Service: 1898

Reason for Removal from Service: Salt water intrusion into wells.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Pines River

Present Ownership and Use of Supply Site: Owned by City of Revere used as Public Works Department yard. Road de-icing materials and road maintenance equipment are stored on the site. Yard is surrounded by commercial establishments and private homes.

Reported Water Quality Defects: Salt water intrusion.

Feasibility of Reactivation: Unfeasible-would require an extensive relocation of existing surface structures and desalination.

1978 MDC Water Use by Community: 2,553.80 mg or 7.00 mgd.

Revere Water Works. Water supply for Revere and Winthrop, Massachusett Average chemical analysis for 1897. Data from the Massachusetts State Board of Health Annual Report of 1897. Chemical values in parts per 100,000.

Color	.02
Residue on Evaporation	149.65
Free Ammonia	.0005
Albuminoid Ammonia	.0019
Chlorine	59.26
Nitrogen as Nitrates	.1272
Nitrogen as Nitrites	.0019
Oxygen consumed	.12
Hardness	48.0
Iron	.0067

Revere Water Works
Water Supply for Revere and Winthrop, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Crystal Brook Supply

Location: In Saugus on Revere line southeast of Lincoln Street.

Community Served: Revere and Winthrop

Type of Supply: Groundwater

Description: Sixty-seven, 2½ inch tubular wells, 30 to 100 feet deep.

Last Reported or Estimated Yield: .60 mgd.

Year Developed: 1891 (by Revere Water Company)

Year Removed from Normal Service: 1898

Reason for Removal from Service: Revere joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Pines River

Present Ownership and Use of Supply Site: Privately owned homes and wetlands.

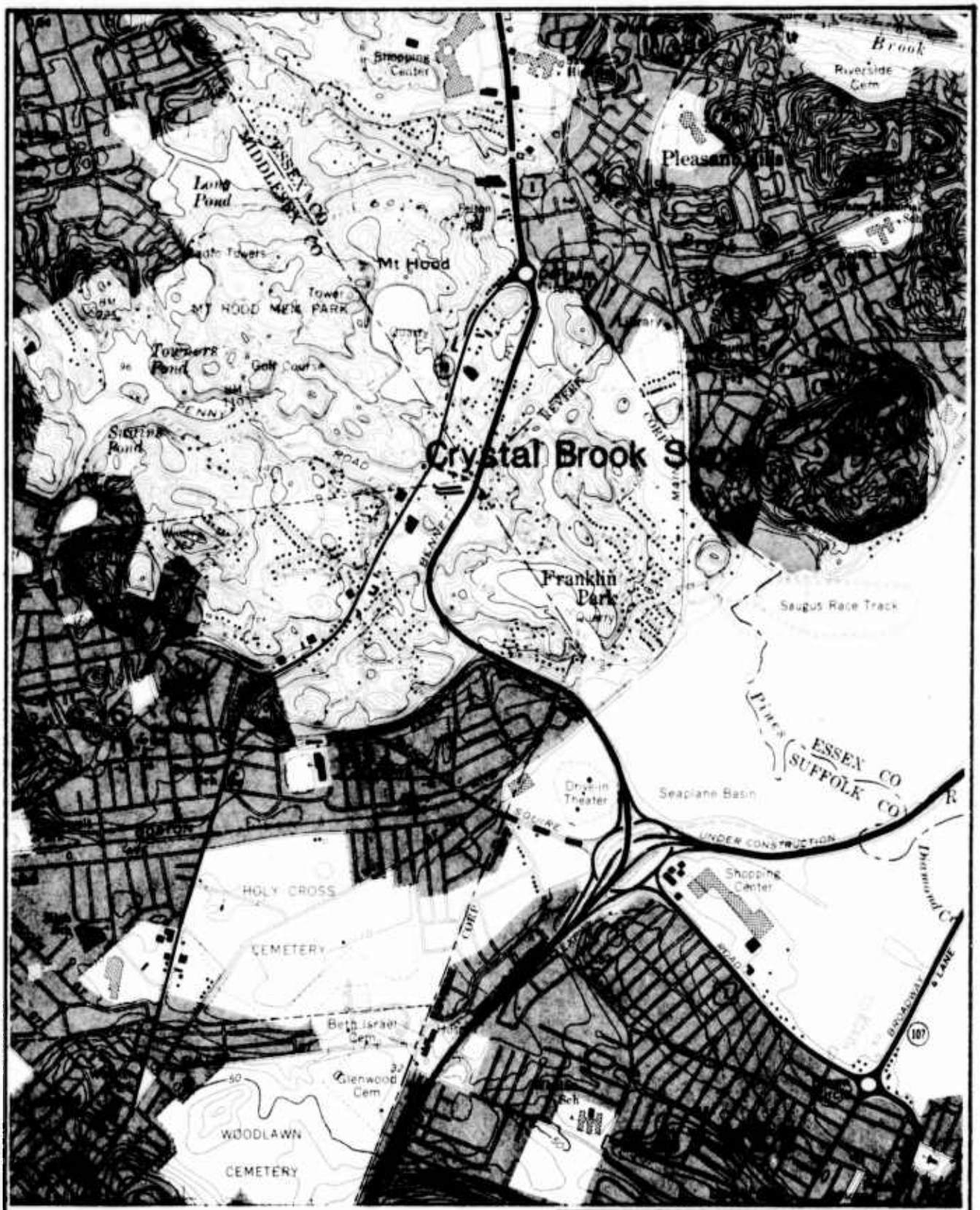
Reported Water Quality Defects: None

Feasibility of Reactivation: Unfeasible-would require the removal of many existing homes.

1978 MDC Water Use by Community: 2,553.80 mg or 7.00 mgd.

Crystal Brook Supply. Water supply for Revere and Winthrop, Massachusetts. Average chemical analysis for 1898. Data from the Massachusetts State Board of Health Annual Report of 1898. Chemical values in parts per 100,000.

Number of Samples	11
Turbidity	None
Sediment	None
Color	.01
Residue on Evaporation	15.06
Free Ammonia	.0003
Albiminoid Ammonia	.0016
Chlorine	1.38
Nitrogen as Nitrates	.2556
Nitrogen as Nitrites	.0004
Oxygen Consumed	.03
Hardness	7.0
Iron	.0021



Crystal Brook Supply
Water Supply for Revere and Winthrop, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Leaping Well Reservoir

Location: In South Hadley, south of Granby Road approximately 4,000 feet southwest of Granby line.

Community Served: South Hadley

Type of Supply: Surface

Description: Reservoir with a surface area of 9 acres, a drainage area of 400 acres and a storage capacity of 30 mg.

Last Reported or Estimated Yield: .28 mgd.

Year Developed: 1892

Year Removed from Normal Service: Reserve since 1952.

Reason for Removal from Service: Low yield.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Leaping Well Brook-Conn River

Present Ownership and Use of Supply Site: Owned by South Hadley Fire District #1 and maintained as a reserve water supply.

Reported Water Quality Defects: Color

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 682.55 mg or 1.87 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Leaping Well Reservoir

Major Downstream Users to be Impacted by Reduced Flow: None - treated wastewater would be returned to watershed.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: None

Pollution Sources on Watershed: Some residential development along the southwestern edge of the reservoir.

Water Quality Parameters Requiring Treatment: Color

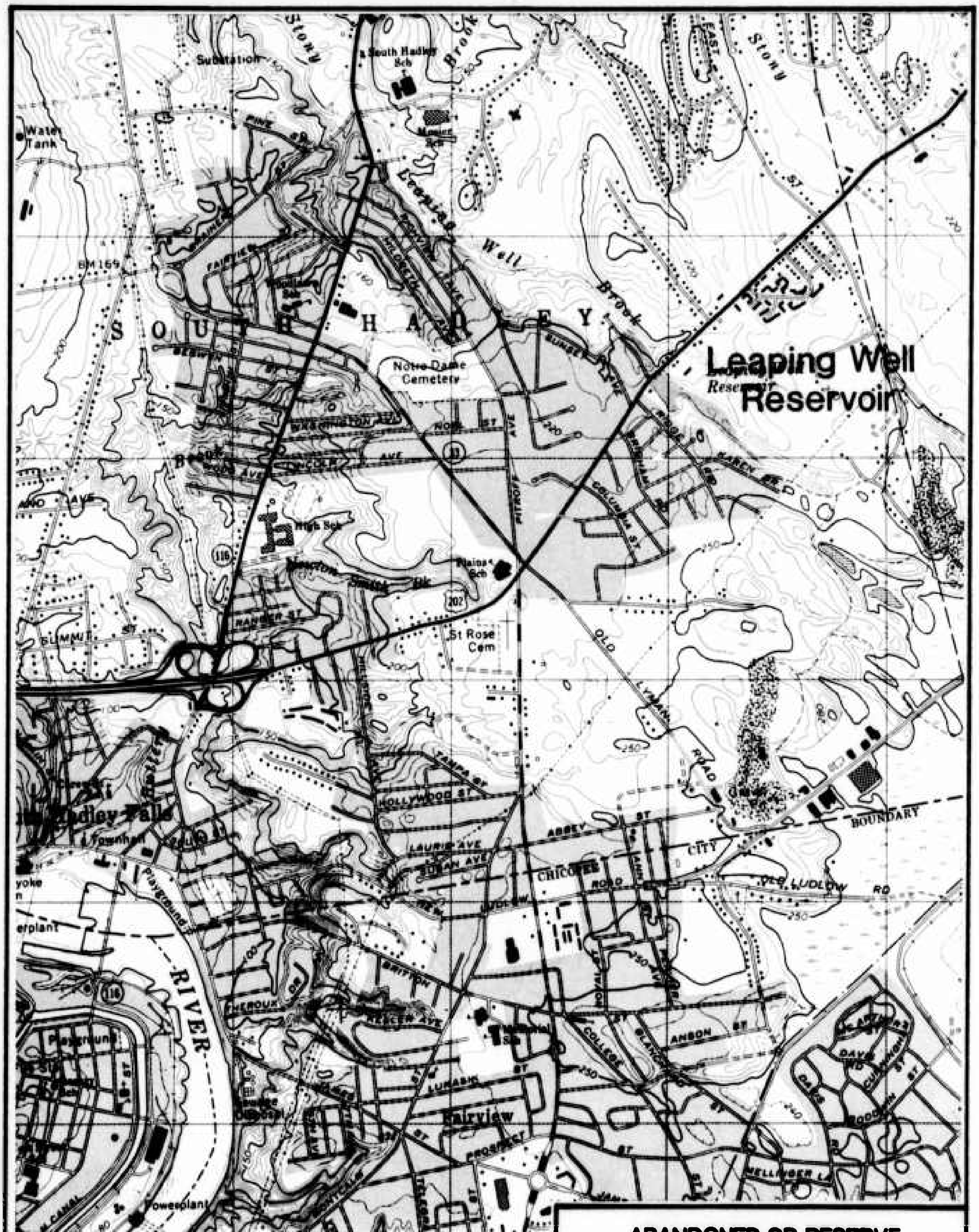
Treatment Required: Chlorination, coagulation, and filtration.

Estimated Cost of Treatment: $680,000 for a .60 mgd treatment plant.

Estimated Total Cost of Reactivation: $700,000 including $20,000 for a new pump motor, controls and valves.

Leaping Well Reservoir. Water supply for South Hadley, Massachusetts. Chemical analysis of June 11, 1971. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Turbidity	0
Sediment	0
Color	15
Odor	0
pH	7.3
Alkalinity	16
Hardness	28
Iron	.08
Manganese	.00
Free Ammonia Nitrogen	.03
Nitrite Nitrogen	.004
Chloride	12
Sodium	5.0



Leaping Well Reservoir
Water Supply for South Hadley, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Marblehead Water Company

Location: In Swampscott along Stacy Brook at New Ocean St. Also along Paradise Road and near Stetson Ave.

Community Served: Swampscott, Marblehead and Nahant

Type of Supply: Groundwater

Description: At Stacy Brook-one dug well 26 feet in diameter by 20 feet deep with 6 tubular wells in bottom, also 72 tubular wells. At Paradise Road-46 tubular wells. At Stetson Ave.-17 tubular wells.

Last Reported or Estimated Yield: .84 mgd.

Year Developed: From 1885 to 1895.

Year Removed from Normal Service: 1899

Reason for Removal from Service: Salt water intrusion into wells.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Stacy Brook

Present Ownership and Use of Supply Site: All three sites are privately owned and developed for residential and commercial purposes.

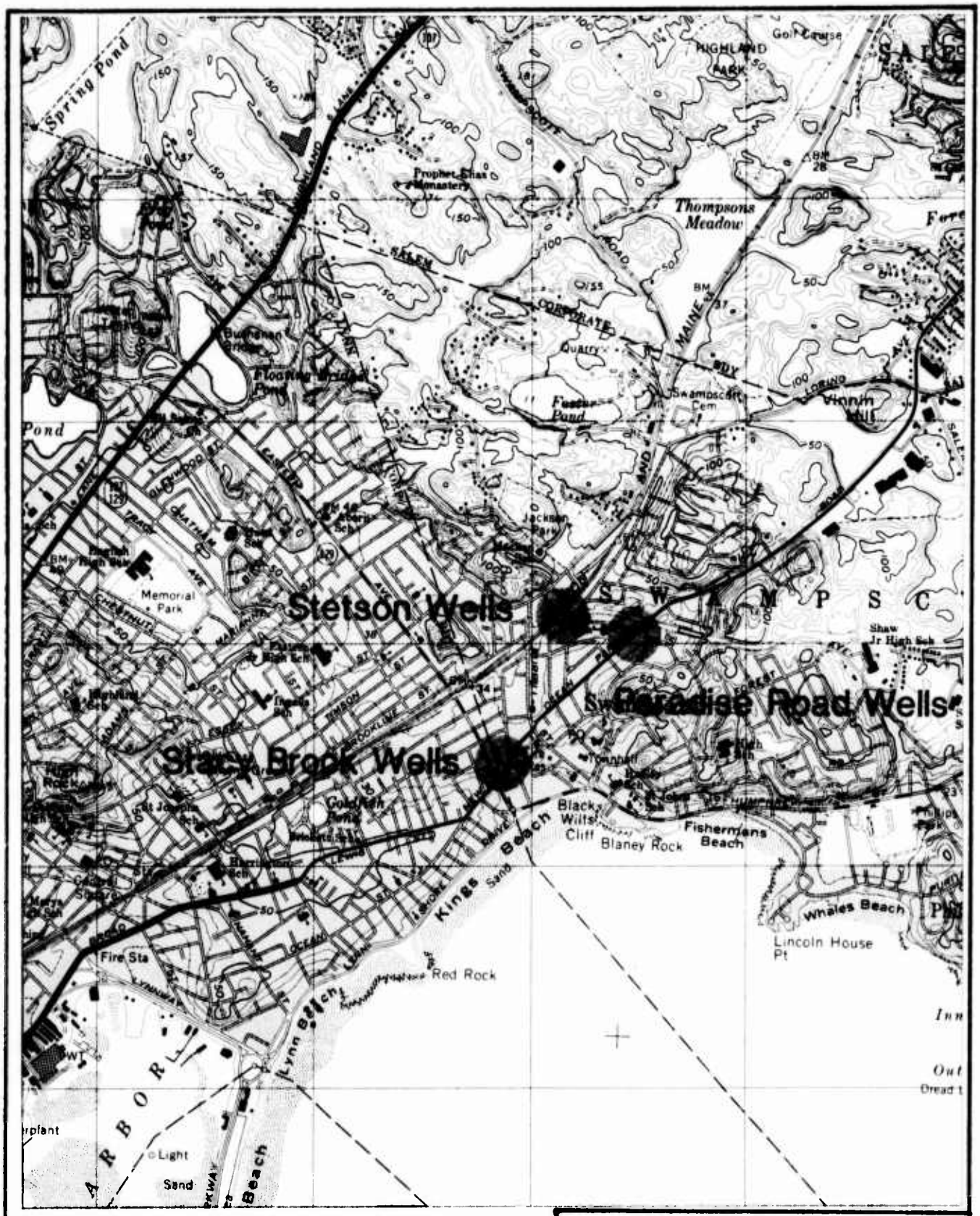
Reported Water Quality Defects: Salt water intrusion and hardness.

Feasibility of Reactivation: Unfeasible-would require an extensive relocation of existing structures and desalination.

1978 MDC Water Use by Community: 1,812.44 mg or 4.97 mgd.

Marblehead Water Company. Water supply for Swampscott, Marblehead and Nahant, Massachusetts. Average chemical analysis of 1899. Data from the Massachusetts State Board of Health Annual Report of 1899. Chemical values in parts per 100,000.

Number of Samples	7
Color	.00
Residue on Evaporation	53.56
Free Ammonia	.0000
Albuminoid Ammonia	.0018
Chlorine	16.18
Nitrogen as Nitrates	.4757
Nitrogen as Nitrites	.0000
Oxygen Consumed	.11
Hardness	17.6
Iron	.0026



Marblehead Water Company
Water Supply for Swampscott, Marblehead and Nahant, Mass.
Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Bay State Road Supply

Location: In Wakefield, south of Route 128 between Interchanges 33 and 34.

Community Served: Wakefield

Type of Supply: Groundwater

Description: One dug well 20 feet in diameter by 30 feet deep and 8 tubular wells.

Last Reported or Estimated Yield: .13 mgd (Initially .50 mgd).

Year Developed: 1927

Year Removed from Normal Service: Tubular wells removed in early 1950's. Dug well taken out of service about 1975.

Reason for Removal from Service: Poor water quality and low yield.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Saugus River

Present Ownership and Use of Supply Site: Owned by Wakefield Public Works Department. The area is not presently in use.

Reported Water Quality Defects: Iron, sodium and chlorides.

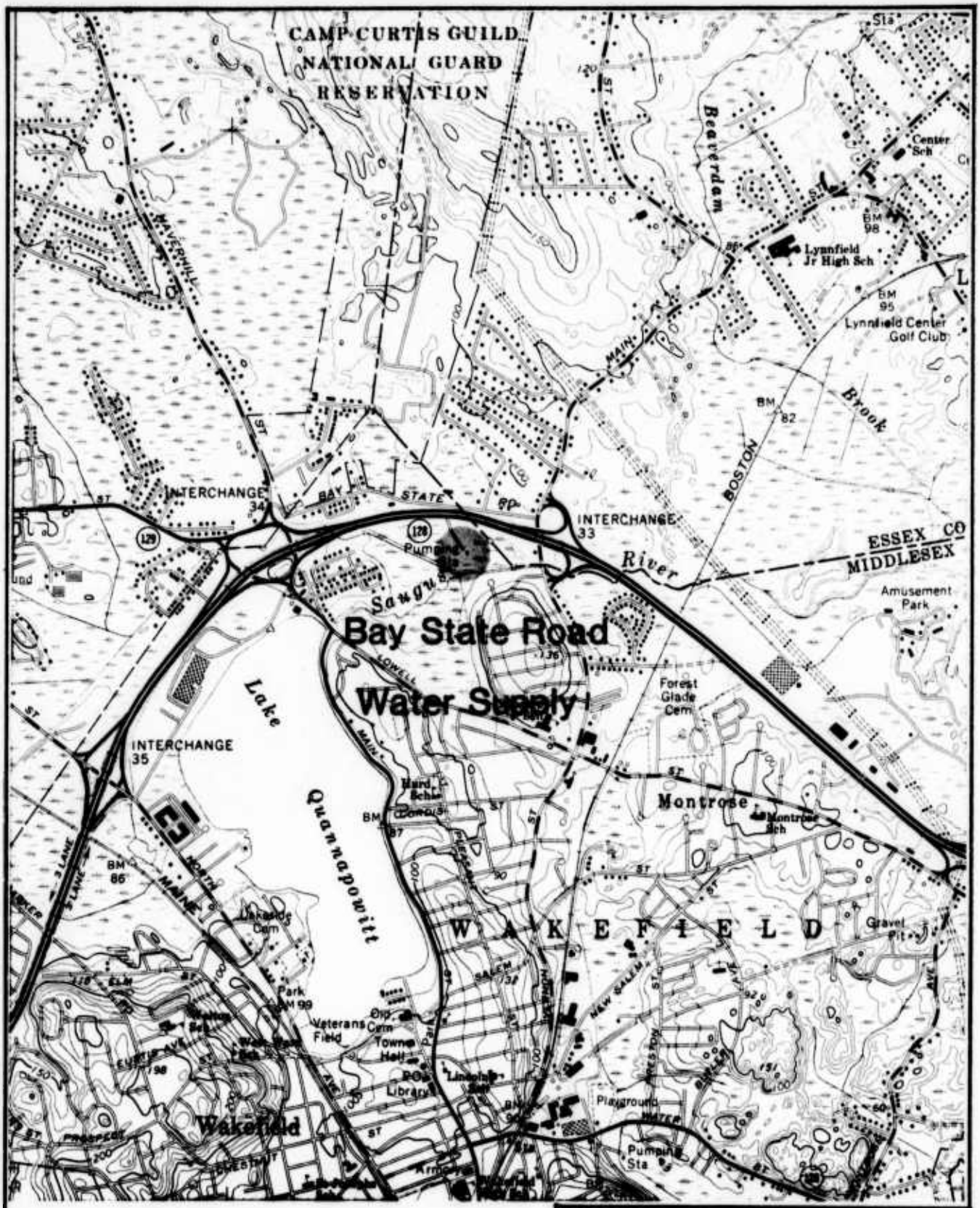
Feasibility of Reactivation: Unfeasible due to low present yield.

1978 MDC Water Use by Community: 711.00 mg or 1.95 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Bay State Road Supply. Water supply for Wakefield, Massachusetts. Chemical analysis of July 19, 1976. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	0
Sediment	0
Color	5
Odor	0
pH	6.7
Alkalinity (Total $CaCO_3$)	69
Hardness ($CaCO_3$)	123
Calcium CCa)	33
Magnesium (Mg)	10
Sodium (Na)	25
Potassium (K)	3.5
Iron (Fe)	.02
Manganese (Mn)	.02
Silica (SiO_2)	12
Sulfate (SO_4)	23
Chloride (Cl)	145
Specific Conductivity (micromhos/cm)	350
Nitrogen-Ammonia	.00
Nitrogen-Nitrate	3.5
Nitrogen-Nitrite	.000
Copper (Cu)	.08



Bay State Road Supply
Water Supply for Wakefield, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Sexton Avenue Supply

Location: In Wakefield, north of Nahant Street.

Community Served: Wakefield

Type of Supply: Groundwater

Description: Ninety-nine 2½ inch tubular wells, 15 to 50 feet deep.

Last Reported or Estimated Yield: .24 mgd.

Year Developed: 27 wells in 1930, 20 wells in 1941, 52 wells in 1958.

Year Removed from Normal Service: About 1969.

Reason for Removal from Service: Poor water quality resulting from the storage of road de-icing chemicals near well field.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Mill River-Saugus River

Present Ownership and Use of Supply Site: Owned by Wakefield Department of Public Works and used as a storage area for road de-icing chemicals, sand, pipe, paving materials and decaying tree stumps.

Reported Water Quality Defects: Iron, manganese and nitrates.

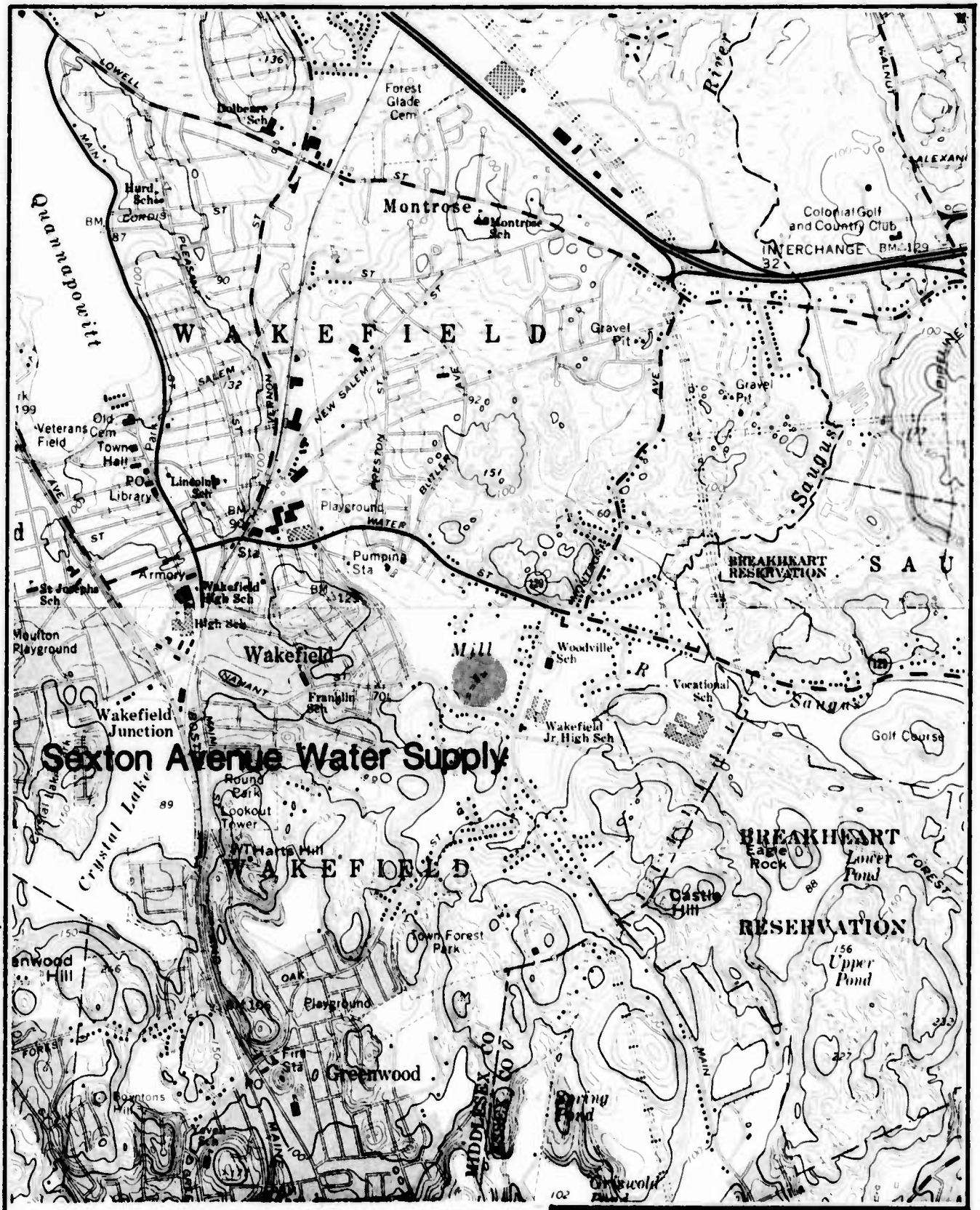
Feasibility of Reactivation: Unfeasible-area has been contaminated by use as a storage site for road de-icing chemicals.

1978 MDC Water Use by Community: 711.00 mg or 1.95 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Sexton Avenue Supply. Water supply for Wakefield, Massachusetts. Chemical analysis of March 7, 1968. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Turbidity	1
Sediment	0
Color	25
Odor	0
pH	6.3
Alkalinity	58
Hardness	98
Iron	1.1
Manganese	.82
Chloride	100
Nitrate	1.3
Nitrite	.000



Sexton Avenue Supply
Water Supply for Wakefield, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Charles River Wells

Location: In Waltham, along the Charles River south of Mt. Feake Cemetary and east of South Street near the Weston line.

Community Served: Waltham

Type of Supply: Groundwater

Description: Dug well (1891) 30 feet deep by 41 feet in diameter; Dug well (1907) 35 feet deep by 30 feet in diameter; Filter basin 1/4 acre x 8 feet, 4 inches deep.

Last Reported or Estimated Yield: 2.5 - 3.0 mgd.

Year Developed: Filter Basin 1873, 1891 - dug well, 1907 - dug well.

Year Removed from Normal Service: 1949

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: Not used. 1891 dug well has been filled in with building debris but could be cleaned out. Owned by the City of Waltham.

Reported Water Quality Defects: Iron, manganese and color in 1891 well.

Feasibility of Reactivation: Potentially feasible to reactivate 1891 well. 1907 well is within 200 feet of a large apartment complex.

1978 MDC Water Use by Community: 4,221.73 mg or 11.57 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Charles River Wells

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could have an adverse impact upon the Charles River particularly during periods of low flow.

Pollution Sources on Watershed: The watershed is heavily developed with highways, industry, commercial properties and residential neighborhoods.

Water Quality Parameters Requiring Treatment: Color, iron and manganese.

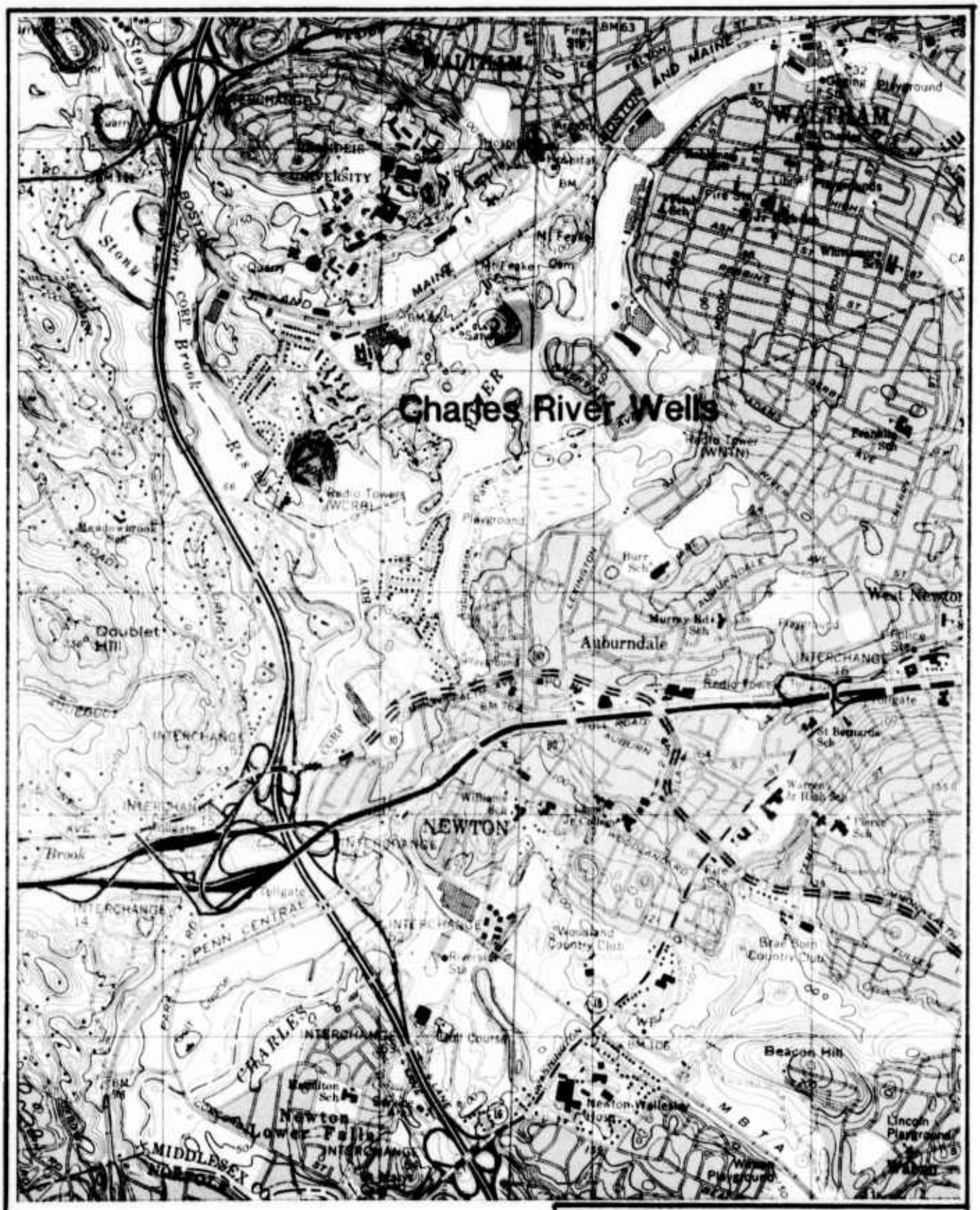
Treatment Required: Chlorination and iron removal.

Estimated Cost of Treatment: $3,000,000 for a 3.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $3,300,000 including $300,000 for a new well, pump, pumphouse and mains.

Charles River Wells. Water supply for Waltham, Massachusetts. Average chemical analysis for 1949. Data from the Massachusetts Department of Public Health Annual Report for the Years 1942 through 1949. Chemical values in parts per million.

	1891 Well	1907 Well
Number of Samples	2	2
Color	18	3
Nitrates	.14	.50
Nitrites	.003	.000
Chlorides	9.0	7.9
Hardness	52	41
Alkalinity	65	23
Manganese	.75	.00
Iron	3.8	.03
pH	6.5	6.2



Charles River Wells
Water Supply for Waltham, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Watertown Water Supply Company

Location: In Watertown, north of the Charles River near the corner of Pleasant Street and Bridge Street.

Community Served: Watertown and Belmont

Type of Supply: Groundwater

Description: Three filter galleries, one 190 feet long, one 175 feet long and one 102 feet long. Also 46 tubular wells and a dug well 20 feet in diameter by 24 feet deep.

Last Reported or Estimated Yield: .51 mgd.

Year Developed: Filter galleries 1885, dug well 1891, tubular wells 1891, 1893.

Year Removed from Normal Service: 1898

Reason for Removal from Service: Unable to meet needs of community, poor water quality. Watertown and Belmont joined the MDC.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Charles River

Present Ownership and Use of Supply Site: Ownership is partially private and partially MDC. The area contains a small park as well as commercial and industrial properties. The area surrounding the site is primarily industrial.

Reported Water Quality Defects: High iron and manganese.

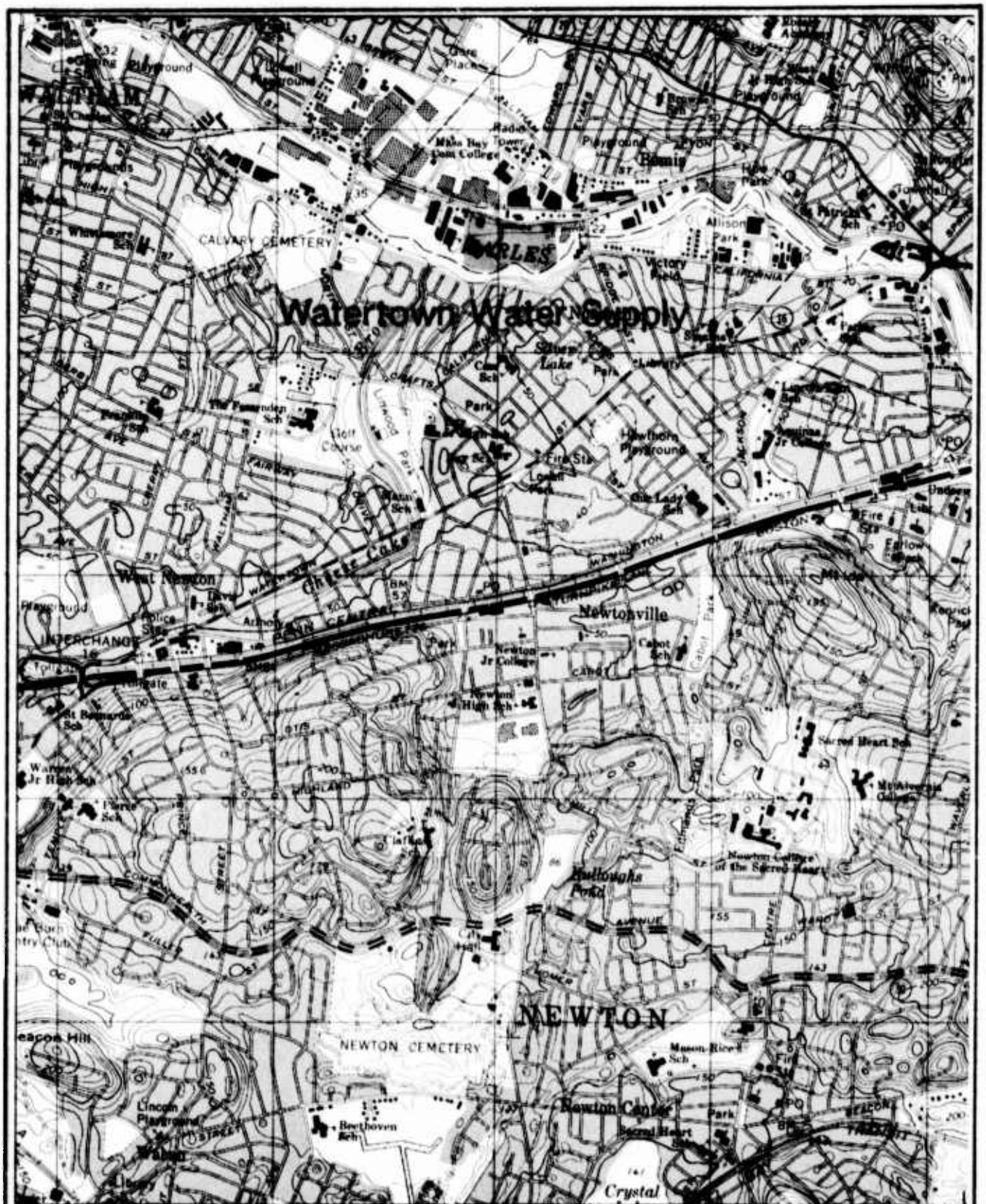
Feasibility of Reactivation: Unfeasible-reactivation would require extensive relocation of existing surface structures.

1978 MDC Water Use by Community: 2,858.05 mg or 7.83 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Watertown Water Supply Company. Water supply for Watertown and Belmont, Massachusetts. Average chemical analysis for 1898. Data from the Massachusetts State Board of Health Annual Report of 1898. Chemical values in parts per 100,000.

Number of Samples	11
Color	.19
Residue on Evaporation	8.04
Free Ammonia	.0055
Albuminoid Ammonia	.0085
Chlorine	.73
Nitrogen as Nitrates	.0815
Nitrogen as Nitrites	.0000
Oxygen Consumed	.17
Hardness	3.4
Iron	.0469



Watertown Water Supply Company
Water Supply for Watertown and Belmont, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Rosemary Brook Supply

Location: In Wellesley, along Rt. 9 west of Cedar Street.

Community Served: Wellesley

Type of Supply: Groundwater

Description: Filter gallery 63 feet long by 12 feet by 18 feet. Fifty, 2½ inch tubular wells, 30 to 65 feet deep (removed in 1966, but holes not filled). Two gravel packed wells.

Last Reported or Estimated Yield: 2.00 mgd.

Year Developed: 1884

Year Removed from Normal Service: Reserve since 1968.

Reason for Removal from Service: Poor water quality. Department of Public Health ordered status changed to emergency reserve.

Treatment Prior to Removal from Service: Chlorination, corrosion control.

Watershed in which Supply is Located: Rosemary Brook - Charles River

Present Ownership and Use of Supply Site: Owned by Town of Wellesley used as a reserve water supply.

Reported Water Quality Defects: High sodium level and pollution hazards.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 0 mg.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Rosemary Brook Supply

Major Downstream Users to be Impacted by Reduced Flow: None

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Public will have to be notified that sodium levels are above 20 mg/l. Reactivation could have an adverse impact upon the Charles River particularly during periods of low flow.

Pollution Sources on Watershed: Sanitary sewer within 400 feet of gravel packed wells. Tubular wells removed in 1966 but holes not filled. Runoff from roads and residential areas.

Water Quality Parameters Requiring Treatment: None

Treatment Required: Chlorination, coagulation, sedimentation and filtration.

Estimated Cost of Treatment: $2,100,000 for a 2.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $2,250,000 including $150,000 for updating of piping.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Rosemary Brook Supply. Water supply for Wellesley, Massachusetts. Chemical analysis of May 7, 1979. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	0.5
Sediment	0
Color	0
Odor	0
pH	7.2
Alkalinity (Total $CaCO_3$)	47
Hardness ($CaCO_3$)	82
Calcium (Ca)	24
Magnesium (Mg)	53
Sodium (Na)	25
Potassium (K)	1.4
Iron (Fe)	.19
Manganese (Mn)	.03
Silica (SiO_2)	13
Sulfate (SO_4)	23
Chloride (Cl)	43
Specific Conductivity (micromhos/cm)	290
Nitrogen-Ammonia	.06
Nitrogen-Nitrate	1.6
Nitrogen-Nitrite	.000
Copper (Cu)	.49

Rosemary Brook Supply
Water Supply for Wellesley, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Warren Avenue Well Field

Location: In Weston, south of Warren Street, north of Rt. 20, near the headwaters of Cherry Brook.

Community Served: Weston

Type of Supply: Groundwater

Description: Dug well 10 feet in diameter and 22 feet deep. Eleven 2½ inch tubular wells, 22 to 25 feet deep.

Last Reported or Estimated Yield: .10 to .30 mgd.

Year Developed: Dug well 1896, tubular wells 1900.

Year Removed from Normal Service: Prior to 1937. Used as an emergency source until at least 1949.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Cherry Brook-Charles River

Present Ownership and Use of Supply Site: Owned by Town of Weston. The site is a wetland area and is adjacent to the Water Department yard.

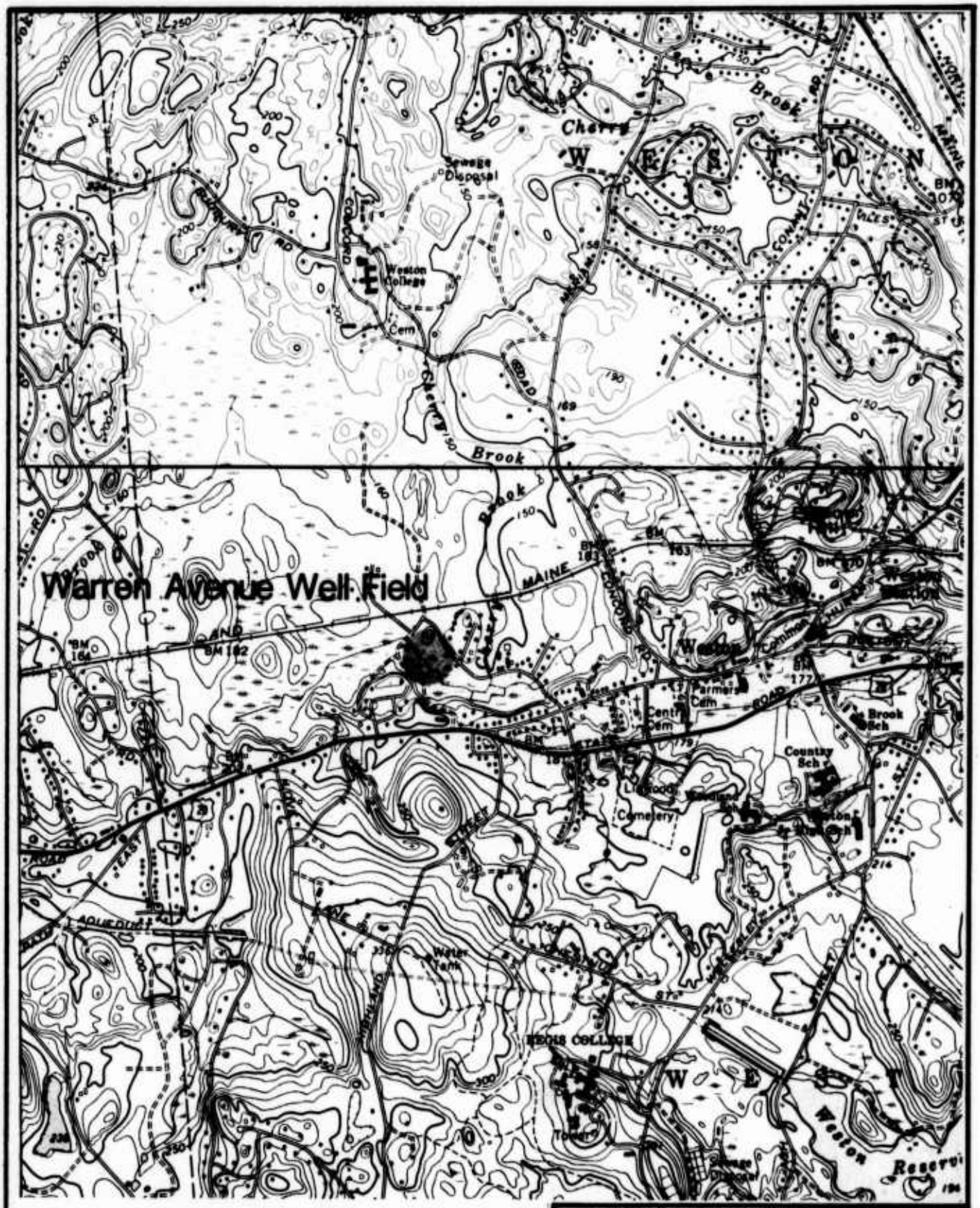
Reported Water Quality Defects: High coliform bacteria count.

Feasibility of Reactivation: Unfeasible to locate and seal old tubular wells in order to prevent pollution of aquafer.

1978 MDC Water Use by Community: 407.38 mg or 1.12 mgd.

Warren Avenue Well Field. Water supply for Weston, Massachusetts. Chemical analysis for 1949. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Color	2
Nitrates	.50
Nitrites	.004
Chlorides	9.6
Hardness	57
Alkalinity	39
Manganese	.00
Iron	.03
pH	6.4



Warren Avenue Well Field
Water Supply for Weston, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Kendal Green Wells

Location: In Weston, along Stony Brook south of Church Street.

Community Served: Weston

Type of Supply: Groundwater

Description: Thirty, 2½ inch tubular wells.

Last Reported or Estimated Yield: .72 mgd.

Year Developed: From 1910 to 1929.

Year Removed from Normal Service: 1972

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Stony Brook-Charles River

Present Ownership and Use of Supply Site: Owned by Town of Weston. Site is a wetland area.

Reported Water Quality Defects: High iron content.

Feasibility of Reactivation: Unfeasible-solid waste disposal area nearby.

1978 MDC Water Use by Community: 407.38 mg or 1.12 mgd.

Kendal Green Wells. Water supply for Weston, Massachusetts. Chemical analysis of August 7, 1972. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in milligrams per liter.

Turbidity	4
Sediment	0
Color	12
Odor	0
pH	6.4
Alkalinity (Total $CaCO_3$)	54
Hardness ($CaCO_3$)	78
Calcium (Ca)	21
Magnesium (Mg)	6.3
Sodium (Na)	16
Potassuim (K)	1.4
Iron (Fe)	.59
Manganese (Mn)	.03
Silica (SiO_2)	18.0
Sulfate (SO_4)	30
Chloride (Cl)	32
Specific Conductivity (micromhos/cm)	240
Nitrogen-Ammonia	.02
Nitrogen-Nitrate	0.6
Nitrogen-Nitrite	.003
Copper (Cu)	.01

Kendal Green Wells
Water Supply for Weston, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Fitzgerald and Nickerson Wells

Location: In Weston, within the interchange of Rt. 128 and the Massachusetts Turnpike.

Community Served: Weston

Type of Supply: Groundwater

Description: Nickerson well 70 feet deep and 24 by 12 inches. Fitzgerald well 49 feet deep and 54 by 24 inches.

Last Reported or Estimated Yield: Fitzgerald, .65 mgd. Nickerson 1.73 mgd.

Year Developed: Nickerson 1942, Fitzgerald 1954

Year Removed from Normal Service: Nickerson on reserve since 1970, Fitzgerald on reserve since 1972.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: None

Watershed in which Supply is Located: Seaverns Brook-Charles River

Present Ownership and Use of Supply Site: Owned by Town of Weston, used as a reserve water supply.

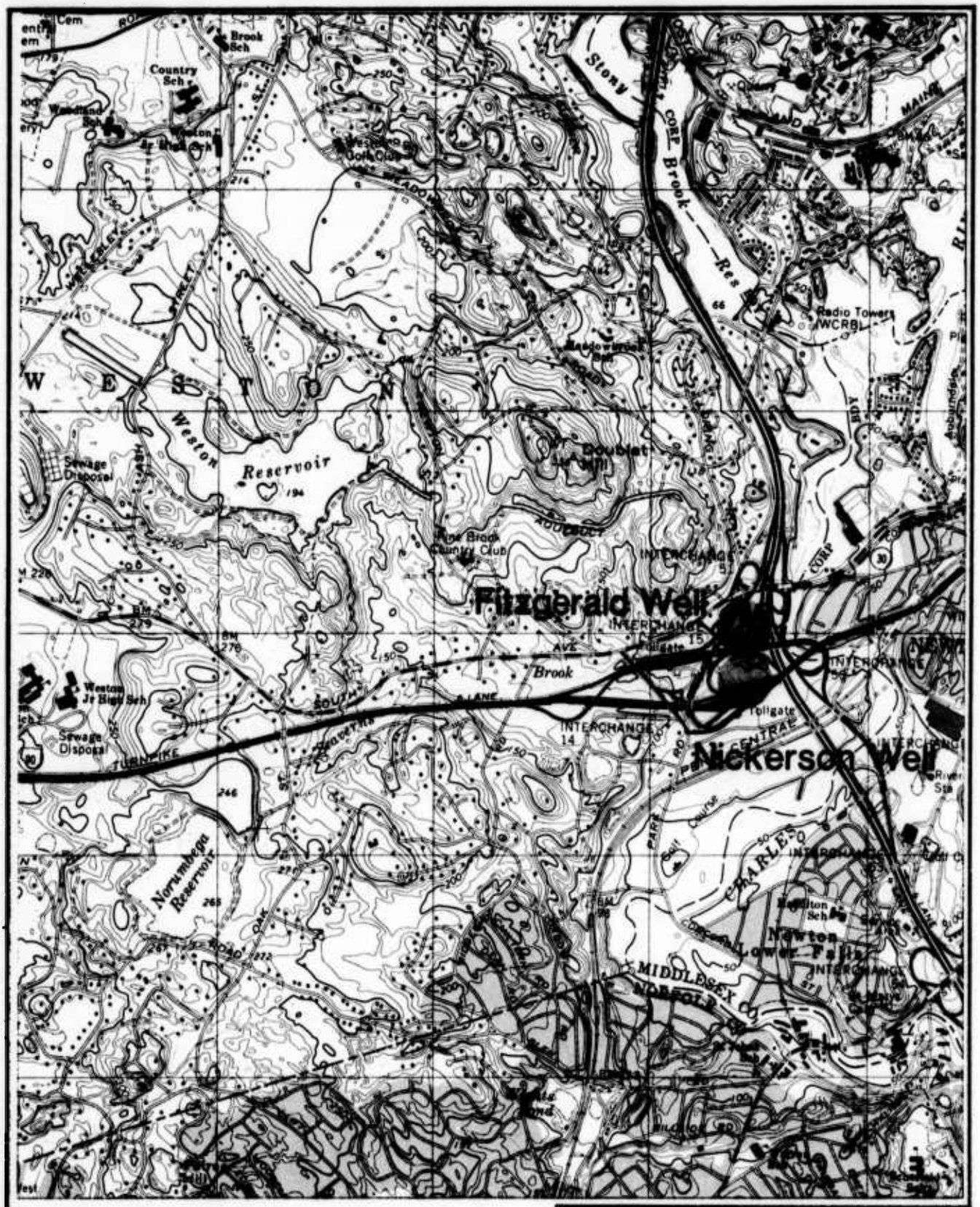
Reported Water Quality Defects: Extremely high sodium chloride levels.

Feasibility of Reactivation: Unfeasible as long as existing road de-icing practices continue in area.

1978 MDC Water Use by Community: 407.38 mg or 1.12 mgd.

Fitzgerald and Nickerson Wells. Water supply for Weston, Massachusetts. Chemical analysis of April 4, 1973. Data from the Massachusetts Dept. of Environmental Quality Engineering. Chemical values in milligrams per liter.

	Fitzgerald Well	Nickerson Well
Turbidity	1	5
Sediment	0	1
Color	0	0
Odor	0	0
pH	6.1	6.2
Alkalinity (Total $CaCO_3$)	32	66
Hardness ($CaCO_3$)	278	511
Calcium (Ca)	80	150
Magnesium (Mg)	19	33
Sodium (Na)	200	280
Potassium (K)	3.5	3.8
Iron (Fe)	.22	.45
Manganese (Mn)	.05	.01
Silica (SiO_2)	14	15
Sulfate (SO_4)	27	29
Chloride (Cl)	450	555
Specific Conductivity (micromhos/cm)	1160	1650
Nitrogen-Ammonia	.01	.02
Nitrogen-Nitrate	1.3	1.2
Nitrogen-Nitrite	.001	.002
Copper (Cu)	.01	.03



Fitzgerald and Nickerson Wells
Water Supply for Weston, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Pond Street Wells

Location: In Winchester, at northeast end of Lynch Jr. High School at the end of Royal Street along Pond Brook.

Community Served: Winchester

Type of Supply: Groundwater

Description: Twenty-five, 2½ inch tubular wells, an average of 25 feet deep.

Last Reported or Estimated Yield: .30 to .50 mgd.

Year Developed: From 1938 to 1949.

Year Removed from Normal Service: 1957

Reason for Removal from Service: Pumped dry in 1957. Not reused since it was felt it would reduce the yield of Woburn's wells at Horn Pond.

Treatment Prior to Removal from Service: Zeolite filters.

Watershed in which Supply is Located: Aberjona River-Mystic River

Present Ownership and Use of Supply Site: Owned by Town of Winchester, used as a storage yard by Department of Public Works. Lynch Jr. High School is located within 150 feet of site.

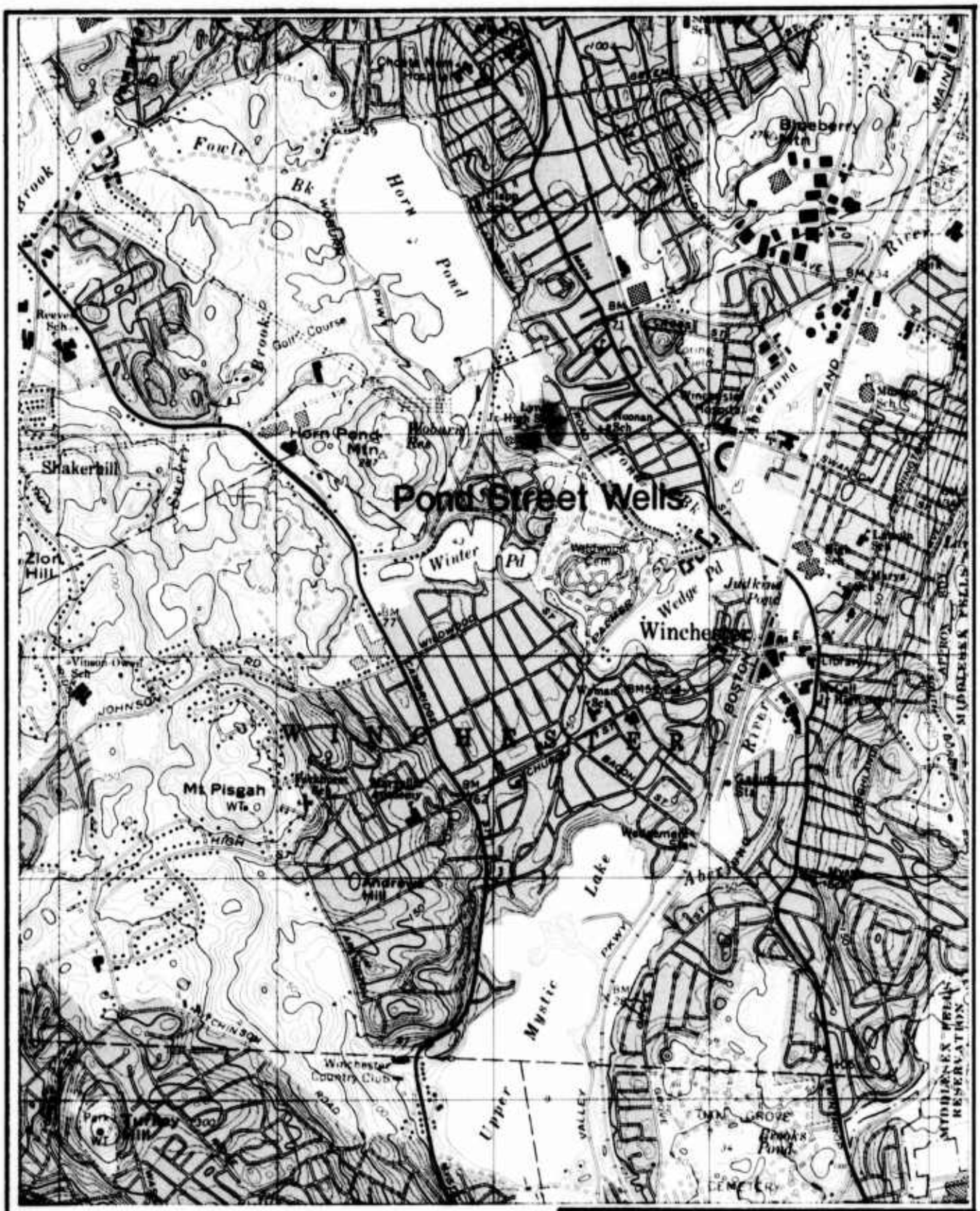
Reported Water Quality Defects: Hardness

Feasibility of Reactivation: Unfeasible-would require relocation of school and private homes and could reduce yield of Woburn's wells.

1978 MDC Water Use by Community: 412.44 mg or 1.13 mgd.

Pond Street Wells. Water supply for Winchester, Massachusetts. Average chemical analysis 1941 to 1944. Data from the Massachusetts Department of Environmental Quality Engineering. Chemical values in parts per million.

Number of Samples	26
Color	2
Free Ammonia	.005
Albuminoid Ammonia	.016
Nitrates	.61
Nitrites	.000
Chlorides	34.8
Hardness	86
Alkalinity	61
Iron	.04
pH	6.7



Pond Street Wells
Water Supply for Winchester, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:25000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Lake Cochituate Wells

Location: In Framingham, north of Rt. 126, just west of the Wayland town line.

Community Served: Framingham

Type of Supply: Groundwater

Description: Three, 8 inch diameter gravel packed wells, 69 to 78 feet deep.

Last Reported or Estimated Yield: 3.00 mgd.

Year Developed: 1939

Year Removed from Normal Service: After 1966 used only during the summer months.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Sudbury River

Present Ownership and Use of Supply Site: Owned by the Town of Framingham and used as a reserve water supply.

Reported Water Quality Defects: Manganese

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: 3,080.40 mg or 8.44 mgd.

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Lake Cochituate Wells

Major Downstream Users to be Impacted by Reduced Flow: Billerica uses the Concord River. Andover, Lawrence and Methuen use the Merrimack River. Sudbury, Wayland and Concord have wells along the Sudbury River.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could reduce the flow of the Sudbury and Concord Rivers.

Pollution Sources on Watershed: Runoff from roads and residential areas on watershed.

Water Quality Parameters Requiring Treatment: Manganese

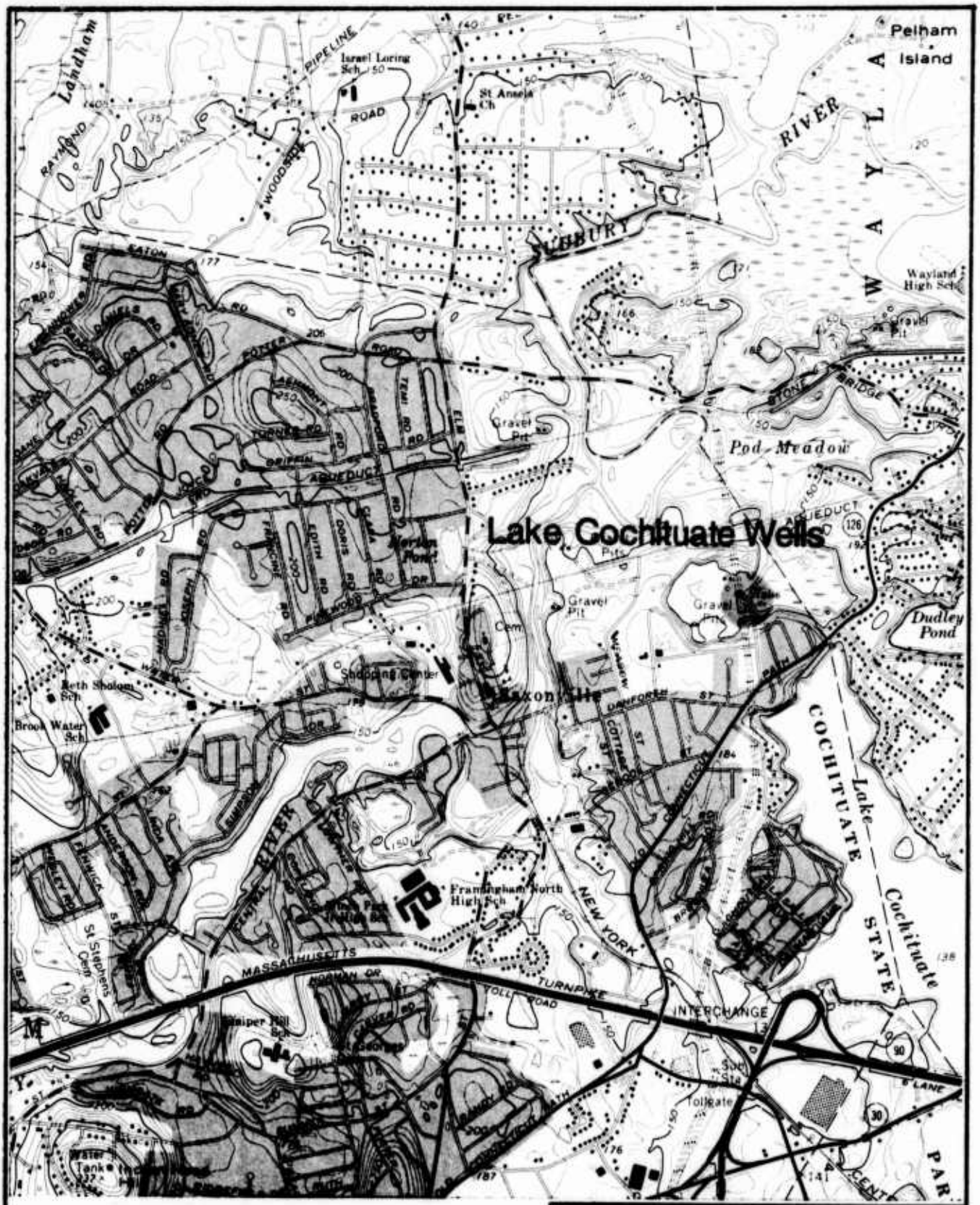
Treatment Required: Chlorination and manganese removal.

Estimated Cost of Treatment: $3,000,000 for a 3.00 mgd treatment plant.

Estimated Total Cost of Reactivation: $3,100,000 including $100,000 for new pumps and controls.

Lake Cochituate Wells. Water supply for Framingham, Massachusetts. Average chemical analysis for 1968. Data from Massachusetts Dept. of Environmental Quality Engineering. Chemical values in milligrams per liter.

	Well No. 1	Well No. 2	Well No. 3
Number of Samples	3	3	2
Color	5	7	3
pH	6.8	6.9	6.8
Alkalinity	53	50	45
Hardness	101	95	87
Iron	.13	.28	.02
Manganese	.52	.11	.03
Nitrate-Nitrogen	0.1	0.1	0.5
Chlorides	20	17	37



Lake Cochituate Wells
Water Supply for Framingham, Mass.

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Scale 1:24000

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Upper Sudbury River Supply (See Appendix A)

Location: In Southborough and southern Marlborough.

Community Served: --

Type of Supply: Surface

Description: Sudbury Reservoir, surface area 1,292 acres, storage capacity 7,253 mg., drainage area 22.3 square miles.

Last Reported or Estimated Yield: 21.90 mgd.

Year Developed: 1896 (used by Southborough beginning in 1924).

Year Removed from Normal Service: 1951 (used by Southborough until 1961). Now a reserve water supply.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Upper Sudbury River

Present Ownership and Use of Supply Site: Owned by the MDC and used as a reserve water supply.

Reported Water Quality Defects: Turbidity and color.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: ---

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Upper Sudbury River Supply

Major Downstream Users to be Impacted by Reduced Flow: Billerica uses the Concord River. Andover, Lawrence, and Methuen use the Merrimack River, Framingham, Sudbury, Wayland and Concord have wells along the Sudbury River.

Known Water Rights Affecting or Precluding Use of Supply: None

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could reduce the flow of the Sudbury and Concord Rivers.

Pollution Sources on Watershed: Septic systems of residential developments and runoff from roads.

Water Quality Parameters Requiring Treatment: Turbidity and color.

Treatment Required: Coagulation, flocculation, sedimentation, and filtration.

Estimated Cost of Treatment: $11,150,000 for a 30 mgd treatment plant.

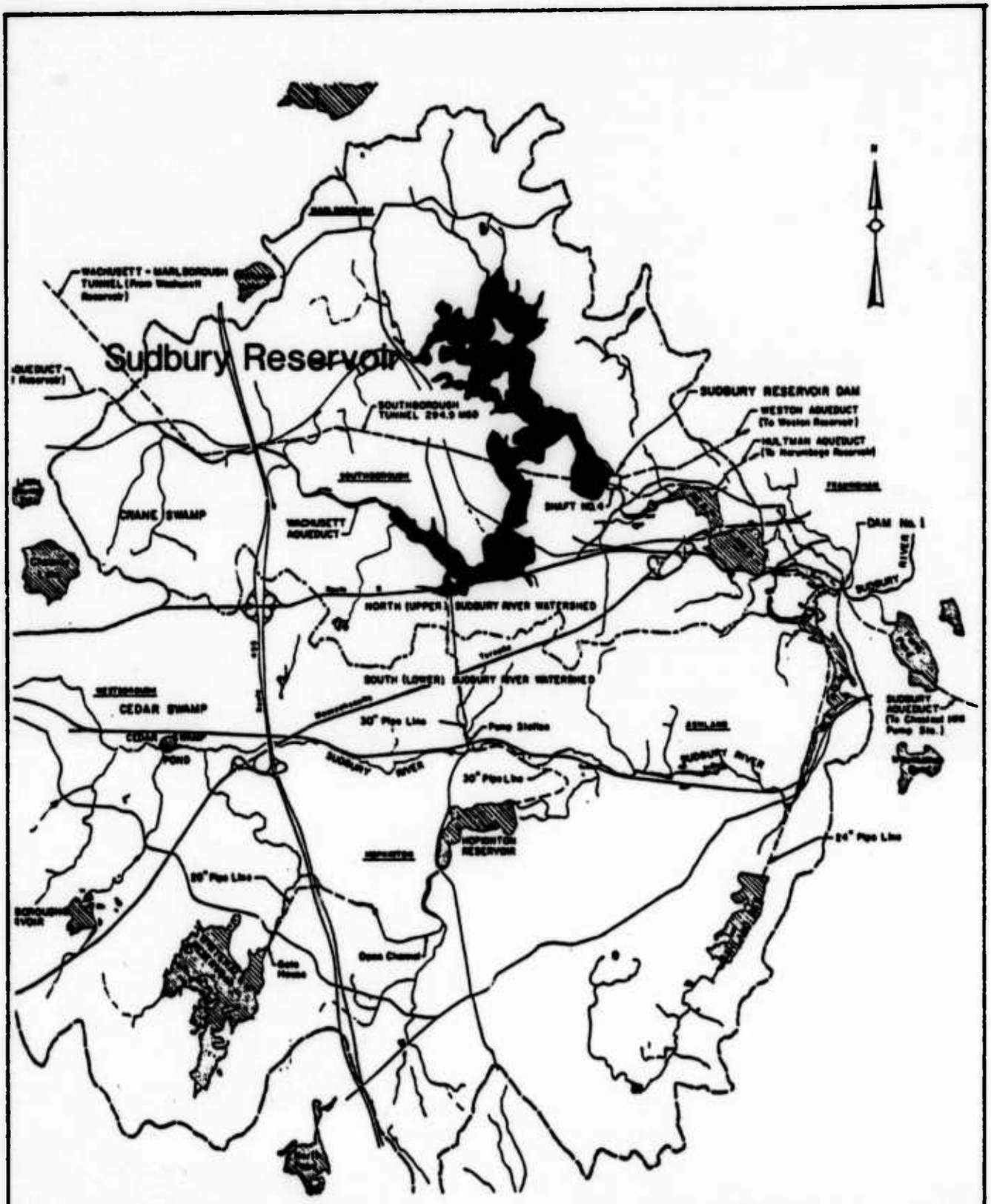
Estimated Total Cost of Reactivation: $11,800,000 including $650,000 for connection to Weston Aqueduct, pilot plant and reservoir de-stratification.

Upper Sudbury River Supply. Chemical analysis for 1978. Data represents composites of weekly samples except where indicated otherwise. Data courtesy of the Metropolitan District Commission. Chemical values in milligrams per liter. Samples taken at Sudbury Reservoir near dam.

Silica (SiO_2)	2.9
Iron (Fe)[1]	0.23
Aluminum (Al)	0.04
Copper (Cu)	<0.02
Arsenic (As)	<0.005
Fluoride (F)	0.06
Manganese (Mn)	<0.02
Calcium (Ca)	7.2
Magnesium (Mg)	2.2
Sodium (Na)	14.4
Potassium (K)	1.5
Total Alkalinity[1]	12
Sulfate (SO_4)	10.6
Chloride (Cl)	23
Ammonia (N)	0.08
Nitrate (N)	0.03
Phosphate (PO_4)	0.12
Total Residue @ 103° C	100
Loss on Ignition @ 550° C	28
Fixed Residue[1]	72
Hardness ($CaCO_3$)	27

Lead (Pb)	<0.005
Zinc (Zn)	<0.02
Specfic Conductance[1] micromhos/cm @ 25°C	158
Free Carbonic Acid[1]	3.3
Dissolved Oxygen[1]	9.9
Dissolved Oxygen Saturation (%)[1]	78
pH[1]	6.8
Color[1]	24
Turbidity[1]	1.3
Cadmium (Cd)	<0.005
Chromium (Cr)	<0.005
Mercury (Hg)	<0.002
Silver (Ag)	<0.005

[1]Averages based on data collected on a weekly, biweekly or quarterly schedule.



Upper Sudbury River Supply

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Approx. Scale 1": 9200'

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Lower Sudbury River Supply (See Appendix A)

Location: In Framingham, Ashland and Hopkinton.

Community Served: ---

Type of Supply: Surface

Description: Six reservoirs, combined surface area 1,500 acres, combined storage 6,268 mg., combined drainage area 52.9 square miles.

Last Reported or Estimated Yield: 34.50 mgd.

Year Developed: From 1875 to 1895.

Year Removed from Normal Service: Three reservoirs removed in 1946. Framingham Reservoirs Nos. 1, 2, and 3 are still reserve water supplies.

Reason for Removal from Service: Poor water quality.

Treatment Prior to Removal from Service: Chlorination

Watershed in which Supply is Located: Lower Sudbury River.

Present Ownership and Use of Supply Site: Three reservoirs are owned by the MDC and are reserve water supplies. Three reservoirs are owned by the Massachusetts Dept. of Environmental Management and are used for recreational purposes such as boating and swimming.

Reported Water Quality Defects: Turbidity, color, and sodium.

Feasibility of Reactivation: Potentially feasible.

1978 MDC Water Use by Community: ---

ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Name of Supply: Lower Sudbury River Supply

Major Downstream Users to be Impacted by Reduced Flow: Billerica uses the Concord River. Andover, Lawrence, and Methuen use the Merrimack River. Framingham, Sudbury, Wayland and Concord have wells along the Sudbury River.

Known Water Rights Affecting or Precluding Use of Supply: A minimum of 1.5 mgd must be released at Framingham Dam No. 1.

Major Environmental Impacts Associated with Reactivation of Supply: Reactivation could reduce the flow of the Sudbury and Concord Rivers. Public will have to be notified that sodium levels are above 20 mg/l.

Pollution Sources on Watershed: Septic systems of residential developments and runoff from roads.

Water Quality Parameters Requiring Treatment: Turbidity and color.

Treatment Required: Coagulation, flocculation, sedimentation, and filtration.

Estimated Cost of Treatment: $29,700,000 for a 75 mgd treatment plant.

Estimated Total Cost of Reactivation: $60,800,000 including $31,100,000 for a 150 mgd pumping station, transmission mains, a connection to the Weston Aqueduct, reservoir de-stratification, and a pilot plant.

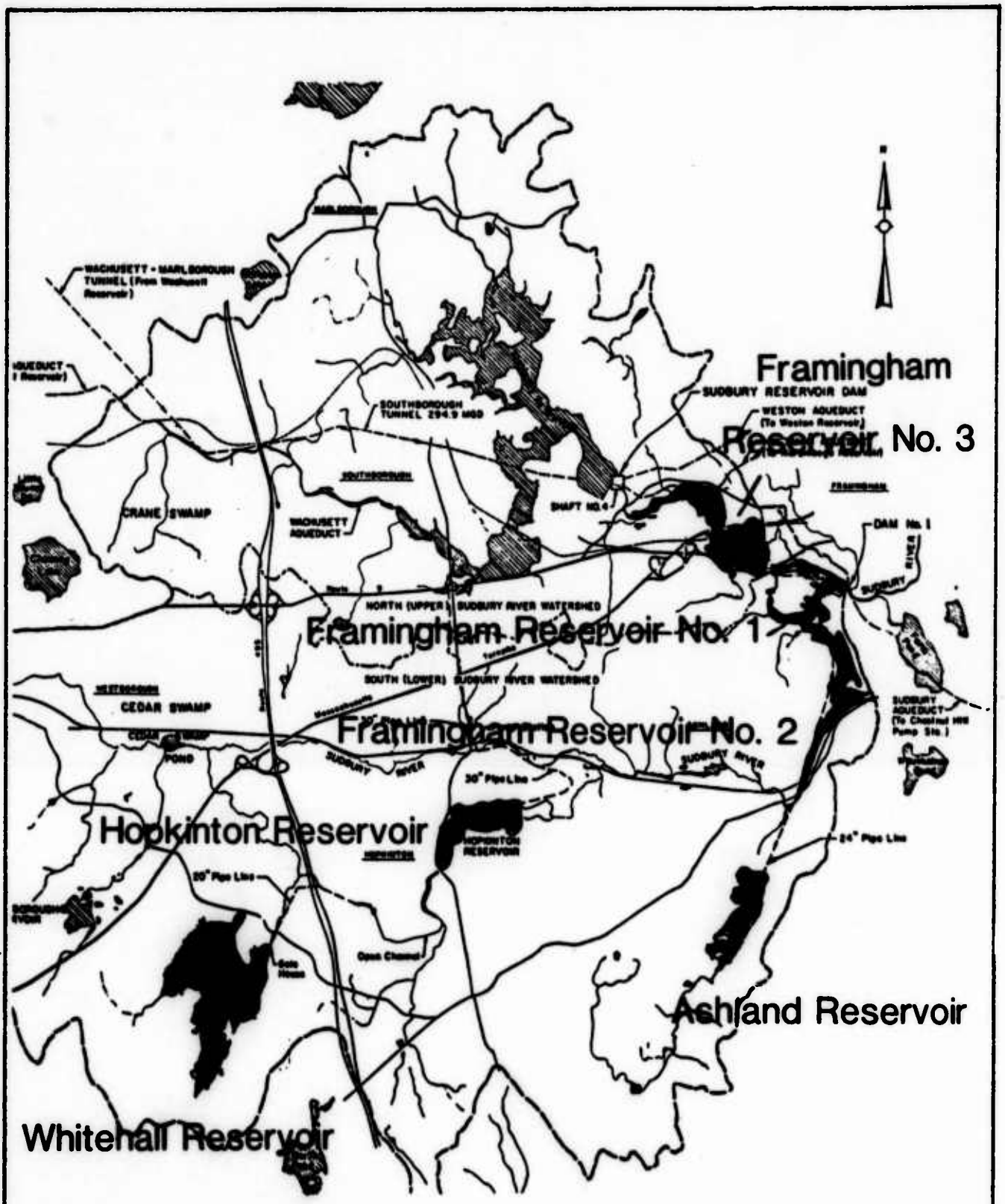
ABANDONED OR RESERVE WATER SUPPLIES FACT SHEET

Lower Sudbury River Supply. Chemical analysis for 1978. Data represents composites of weekly samples except where indicated otherwise. Data courtesy of the Metropolitan District Commission. Chemical values in milligrams per liter. Samples taken from Framingham Reservoir No. 1 near dam and Framingham Reservoir No. 3 near dam.

	Framingham Reservoir No. 1	Framingham Reservoir No. 3
Silica (SiO_2)	4.8	3.0
Iron (Fe)[1]	0.27	0.14
Aluminum (Al)	0.07	0.04
Copper (Cu)	<0.02	<0.02
Arsenic (As)	<0.005	<0.005
Fluoride (F)	0.09	0.07
Manganese (Mn)	0.03	<0.02
Calcium (Ca)	8.4	7.6
Magnesium (Mg)	2.9	2.7
Sodium (Na)	22.5	18.0
Potassium (K)	1.5	1.5
Total Alkalinity[1]	14	13
Sulfate (SO_4)	12.9	11.8
Chloride (Cl)	38	29
Ammonia (N)	0.11	0.08
Nitrate (N)	0.14	0.15
Phosphate (PO_4)	0.18	0.19
Total Residue @ 103° C[1]	131	100
Loss on Ignition @ 550° C[1]	29	36
Fixed Residue[1]	102	64
Hardness ($CaCO_3$)	33	30
Lead (Pb)	< 0.005	< 0.005
Zinc (Zn)	< 0.02	<0.02
Specific Conductance[1] micromhos/cm @ 25°C	202	176
Free Carbonic Acid[1]	3.5	3.5

	Framingham Reservoir No. 1	Framingham Reservoir No. 3
Dissolved Oxygen[1]	10.7	10.8
Dissolved Oxygen Saturation (%)[1]	87	89
pH[1]	6.9	70
Color[1]	48	23
Turbidity[1]	1.7	1.4
Cadmium (Cd)	< 0.005	< 0.005
Chromium (Cr)	< 0.005	< 0.005
Mercury (Hg)	< 0.002	< 0.002
Silver (Ag)	< 0.005	< 0.005

[1]Averages based on data collected on a weekly, biweekly or quarterly schedule.



Lower Sudbury River Supply

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.
Approx. Scale 1": 9200'

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.
November 1979

DATA MATRIX

Community Served	1978 MDC Water Use	Supply Name	Location	Watershed in which Supply is Located	Type of Supply	Description of Supply	Year Developed	Year Removed From Normal Service	Reason for Removal from Normal Service	W
Arlington	1,795.03 mg or 4.92 mgd	Arlington Reservoir	East Lexington & West Arlington	Mill Brook - Lower Mystic Lake	Surface	Reservoir Surface Area = 31 Acres; Storage = 77 mg.	1372	1899	Poor water quality, Arlington joined the MDC	Wa th te
Arlington	1,795.03 mg or 4.92 mgd	Great Meadows	Lexington	Mill Brook - Lower Mystic Lake	Groundwater	Tubular Wells	1895	1899	Poor water quality, Arlington joined the MDC.	
Boston	52,213.55 mg or 143.05 mgd	Lake Cochituate	Natick, Wayland, Framingham	Sudbury River	Surface	Reservoir Surface Area = 710 Acres; Storage 2,000 mg.	1848	1931	Poor water quality	Ch
Brookline	2,766.62 mg or 7.58 mgd	Charles River Supply	Boston (West Roxbury) and Dedham	Charles River	Groundwater	Infiltration gallery and 175 tubular wells	1875	1953	Poor water quality	Ac tr
Canton	356.00 mg or .97 mgd	Springdale Supply	South Canton & North Stoughton	East Branch of the Neponset River	Groundwater	Three (3) dug wells & nineteen (19) tubular wells	From 1889 To 1927	1952-1 Well 1969-2 Wells	Contamination of wells with polluted surface water.	Ch
Chicopee	4,480.84 mg or 12.28 mgd	Chicopee River Canal	Chicopee	Chicopee River-Connecticut River	Surface	River water taken through a canal	1883	1893	Typhoid Fever outbreak.	
Chicopee	4,480.84 mg or 12.28 mgd	Cooley Brook & Morton Brook Reservoirs	Chicopee	Chicopee River	Surface	Combined Surface Area = 34 Acres; Storage = 145 mg.	1893, Cooley Rebuilt 1913	1950	Inability to meet the needs of the City.	
Chicopee	4,480.84 mg or 12.28 mgd	Abbey Brook Supply	Springfield	Abbey Brook - Chicopee River	Surface	Two (2) reservoirs, Combined Surface Area = 3.75 Acres; Storage = 5 mg.	From 1845 To 1877	1918 To 1927	Poor water quality due to solid waste disposal area nearby.	
Clinton	832.80 mg or 2.28 mgd	Wekepeke Brook Supply	Sterling	North Nashua River	Surface	Four (4) reservoirs, Combined Surface Area = 56.5 Acres; Storage = 230.9 mg.	From 1882 To 1926	Three (3) Reservoirs in 1933, one (1) until 1964, now a reserve	Poor water quality	
Chelsea, Everett, Somerville, Charlestown	7,589.13 mg or 20.79 mgd	Upper Mystic Lake	Arlington, Medford, Winchester	Mystic River	Surface	Reservoir Surface Area = 167 Acres; Storage = 380 mg.	1864	1898	Poor water quality	
Framingham	3,080.40 mg or 8.44 mgd	Farm Pond	Framingham	Eames Brook - Sudbury River	Surface	Two (2) filter galleries. Pond Surface Area = 165 Acres; Storage = 167.5 mg.	1885	1939	Poor water quality	
Lexington	2,000.15 mg or 5.48 mgd	Vine Brook Supply	Lexington	Vine Brook - Shawsheen River	Groundwater and Surface	Four (4) dug wells, ten (10) to fifteen (15) tubular wells. Reservoir Surface Area = 6 Acres; Storage = 14 mg.	Wells 1884 to 1902; Reservoir 1897	1902	Lexington joined the	
Malden	2,368.87 mg or 6.49 mgd	Maplewood Wells	Malden	Malden River - Mystic River	Groundwater	99 tubular wells	From 1889 To 1895	1898	Poor water quality. joined the	
Marblehead, Nahant, Swampscott	1,812.44 mg or 4.97 mgd	Thompsons Meadow	Salem	Forest River	Groundwater	Twenty-one (21) tubular wells from 1897 to 1899, sixteen (16) tubular wells after 1923	From 1897 to 1899 and again in 1923	1949	Poor water quality.	
Marblehead	909.91 mg or 2.49 mgd	Loring Avenue Supply	Salem	Forest River	Groundwater	Two (2) dug wells; Thirty-nine (39) tubular wells	1889	1949	Poor water quality and salt water intrusion.	
Marlborough	1,146.47 mg or 3.14 mgd	Williams Lake	Marlborough	Assabet River	Surface	Lake with Surface Area = 73 Acres; Storage = 250 mg.	1883	Use Reduced in 1961, now held in reserve	Poor water quality	Ch Co Co

Reason for emoval from rmal Service	Treatment While in Use	Present Ownership of Site	Present Use of Site	Reason if Unfeasible to Reactivate	Major Downstream Users Impacted By Reactivation	Known Water Rights Affecting Reactivation	Water Quality Parameters Requiring Treatment	Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Cost Reactivati
or water quality, Arlington ined the MDC	Water drawn through a filter gallery.	Town of Arlington	Swimming	Solid waste disposal site drains into Reservoir						
or water quality, Arlington ined the MDC.	None	Town of Arlington	Wetlands	None	None	None	Color, Iron	Chlorination, Iron Removal	$1,200,000 for 1.00 mgd Plant	$ 1,335,0
or water quality	Chlorination	Mass. Dept. of Environmental Management & Private; MDC has water rights	Boating	Would reduce yield of supplies of Natick and Framingham						
or water quality	Aeration, Filtration	City of Boston & MDC	Solid waste disposal area and wetlands	Solid waste disposal area on site						
ntamination wells with luted surface water.	Chlorination	Town of Canton	Open Space	None	Canton, Dedham Water Company	None	Turbidity, Color, Manganese, Nitrates, Iron	Chlorination, Coagulation, Sedimentation, Filtration	$900,000 for .70 mgd Plant	$ 1,430,0
hoid Fever break.	None	Private	Industrial	None	None	None	Color, Turbidity, Iron	Chlorination, Coagulation, Sedimentation, Filtration, Activated Carbon	$19,000,000 for 20.00 mgd Plant	$20,000,0
bility to t the needs the City	Chlorination, Filtration.	Mass. Dept. of Environmental Management	Swimming, Boating (Chicopee Memorial State Park)	None	None	None	Color	Chlorination, Coagulation, Sedimentation, Filtration	$5,400,000 for 6.00 mgd Plant	$ 5,700,0
r water quality due to id waste posal area rby	None	Private	Not Used	Reservoirs now drained. Solid waste disposal site nearby						
r water quality	Chlorination	Town of Clinton	Reserve water supply	None	None	None	Color	Chlorination, Coagulation, Sedimentation. Filtration	$2,500,000 for 2.40 mgd Plant	$ 4,000,0
r water quality	None	MDC and Private	Park and Residential	Extremely poor quality water						
r water quality	Chlorination, water taken through filter galleries	Town of Framingham & Private; MDC holds water rights	Playground, Residential, Industrial	None	None	MDC has water rights	Color, Taste, Odor	Chlorination, Coagulation, Sedimentation, Filtration, Activated Carbon	$2,200,000 for 1.40 mgd Plant	$ 2,250,0
ington ned the MDC.	None	Town of Lexington	Swimming, Fishing, Baseball, and site for a school	Solid waste disposal site nearby. Could reduce yield of Burlington wells						
r water quality. Malden ned the MDC.	None	City of Malden & Private	Site of a School and Industrial	Would require a major relocation of existing surface structures						
r water quality.	Chlorination, Aeration, Filtration	Town of Marblehead	Wetland	Solid waste disposal site upstream						
r water quality and salt r intrusion.	Aeration, Filtration	Town of Marblehead	Wetland	Desalination would be necessary						
r water quality	Chlorination, Corrosion Control	City of Marlborough	Reserve water supply	None	Marlborough, Hudson, Maynard	None	Taste, Odor	Chlorination, Flocculation, Carbon Addition, Settling Filtration	See Millham Reservoir	See Millham Reservoir

Water fecting ration	Water Quality Parameters Requiring Treatment	Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Cost of Reactivation	Cost of Water Per Million Gallons	Major Environmental Impacts of Reactivation	Reason if Impractical to Reactivate	Yield of Unfeasible Supplies (mgd)	Yield of Impractical Supplies (mgd)	Yield of Practical Supplies (mgd)
								.90		
	Color, Iron	Chlorination, Iron Removal	$1,200,000 for 1.00 mgd Plant	$ 1,335,000	$532	Reduce flow of the Mystic River	Excessive Cost		1.00	
								8.00		
								3.75		
	Turbidity, Color, Manganese, Nitrates, Iron	Chlorination, Coagulation, Sedimentation, Filtration	$900,000 for .70 mgd Plant	$ 1,430,000	$515	High sodium level. Reduce flow of the Neponset River	Excessive Cost		.70	
	Color, Turbidity, Iron	Chlorination, Coagulation, Sedimentation, Filtration, Activated Carbon	$19,000,000 for 20.00 mgd Plant	$20,000,000	$449	None	None			10.00
	Color	Chlorination, Coagulation, Sedimentation, Filtration	$5,400,000 for 6.00 mgd Plant	$ 5,700,000	$417	None	one			3.03
								.20		
	Color	Chlorination, Coagulation, Sedimentation, Filtration	$2,500,000 for 2.40 mgd Plant	$ 4,000,000	$735	None	Excessive Cost		1.20	
								7.00		
ater	Color, Taste Odor	Chlorination, Coagulation, Sedimentation, Filtration, Activated Carbon	$2,200,000 for 1.40 mgd Plant	$ 2,250,000	$595	None	Excessive Cost		.70	
								.20-.30		
								1.00		
								.20		
								.63		
	Taste, Odor	Chlorination, Flocculation, Carbon Addition, Settling, Filtration	See Millham Reservoir	See Millham Reservoir	See Millham Reservoir	High sodium level. Reduce flow of the Assabet River	None			See Millham Reservoir

Community Served	1978 MDC Water Use	Supply Name	Location	Watershed in which Supply is Located	Type of Supply	Description of Supply	Year Developed	Year Removed From Normal Service	Reason for Removal from Normal Service	Tr Whi
Marlborough	1,146.47 mg or 3.14 mgd	Millham Reservoir	Marlborough	Assabet River	Surface	Reservoir, Surface Area = 67 Acres; Storage = 450 mg.	1893	Use was reduced in 1961, now a reserve supply	Poor water quality	Chlo Corr Cont
Medford	3,348.08 mg or 9.17 mgd	Spot Pond Auxiliary Supply	Medford	Mystic River	Surface	Wrights Pond, Surface Area = 23 Acres; Storage = 72 mg. Also, brook draining pond	1883	1898	Poor water quality. Medford joined the MDC	
Melrose	1,120.18 mg or 3.07 mgd	Spot Pond Wells	Melrose	Spot Pond - Mystic River	Groundwater	Fifteen (15) tubular wells	1893	1896	Melrose joined the MDC	
Milton	1,230.21 mg or 3.37 mgd	Hyde Park Water Company	Hyde Park in Boston and in Dedham	Neponset River	Groundwater	Two-Hundred (200) tubular wells along the Neponset River and Twenty-One (21) tubular wells along Mother Brook	From 1885 To 1900	Approximately 1911	Poor water quality	
Needham	364.37 mg or .99 mgd	Dedham Avenue Supply	Needham	Charles River	Groundwater and Surface	Two (2) dug wells with a small spring diverted into them and thirty-eight (38) tubular wells	From 1890 To 1924	Tubular wells about 1935, spring 1964, dug wells reserve since 1971	Supply no longer needed	Chl
Needham	364.37 mg or .99 mgd	Great Plain Avenue Supply	Needham	Charles River	Groundwater	Fifty (50) tubular wells	From 1930 To 1935	1946	Poor water quality	Chl
Newton	4,161.64 mg or 11.40 mgd	Newton Water Works Reservation	East Needham and West Newton	Charles River	Groundwater	Four (4) dug wells, an infiltration basin & 300 to 400 tubular wells.	From 1875 To 1938	1953	Inadequate yield and need to upgrade equipment	Chl Amm
Northborough	7.38 mg or .02 mgd	Cold Harbor Brook Reservoir	Shrewsbury	Assabet River	Surface	Reservoir with 9-acre surface and storage of 12 mg.	1883	1966	Poor water quality	Chl Coa Fil
Norwood	1,498.67 mg or 4.11 mgd	Buckmaster Pond	Westwood	Neponset River	Groundwater	Well in reservoir with a Surface Area of 29.5 Acres; Storage = 123 mg.	1885	Approximately 1957	Norwood joined the MDC	Chl Fil
Norwood	1,498.67 mg or 4.11 mgd	Ellis Station Supply	Norwood	Neponset River	Groundwater	Two (2) gravel-packed wells; 133 tubular wells	From 1900 To 1921	1957	Norwood joined the MDC	Aer Fil pH men
Peabody	281.10 mg or .77 mgd	Pine Street & Johnson Street Wells	Peabody	Ipswich River	Groundwater	Two (2) gravel-packed wells	Pine Street - 1957 Johnson Street 1962	Reserve since about 1973	Poor water quality	Chl
Peabody	281.10 mg or .77 mgd	Cedar Pond	Peabody	Goldthwait Brook - North River	Groundwater and Surface	Pond Surface Area = 12 Acres; Storage = 5 mg. Tubular Wells	Wells - 1912 Surface - 1915	Wells 1915, Surface a Reserve until 1938	Poor water quality	Iro
Quincy	4,208.49 mg or 11.53 mgd	Penn Street Wells	Quincy	Town Brook - Weymouth Fore River	Groundwater and Surface	Two (2) dug wells and water from Town Brook	1884	1897	Quincy joined MDC	
Quincy	4,208.49 mg or 11.53 mgd	Old Quincy Reservoir	Quincy	Town Brook - Weymouth Fore River	Surface	Reservoir Surface Area = 46 Acres; Storage = 188 mg.	1888	1899	Poor water quality	Fil

Treatment While in Use	Present Ownership of Site	Present Use of Site	Reason if Unfeasible to Reactivate	Major Downstream Users Impacted By Reactivation	Known Water Rights Affecting Reactivation	Water Quality Parameters Requiring Treatment	Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Cost of Reactivation	of Mill
hlorination, orrosion ontrol	City of Marlborough	Reserve water supply	None	Marlborough, Hudson, Maynard	None	Taste, Color, Turbidity, Odor, Iron	Chlorination, Flocculation, Carbon Addition, Settling, Filtration	$3,750,000 for 2.20 mgd Plant	$7,250,000	
None	City of Medford & Private	Swimming, Private Homes	None	None	None	Color, Odor, Taste	Chlorination, Coagulation, Sedimentation, Filtration	$620,000 for .45 mgd Plant	$ 660,000	
None	City of Melrose	Playground and Baseball Field	Would require a major relocation of existing surface structures							
None	MDC, Private & Town of Dedham	Commercial, Industrial, Residential	Would require a major relocation of existing surface structures							
Chlorination	Town of Needham & Private	Dug well site a reserve water supply. Spring site a park. Tubular well site is residential	Potentially feasible to reactivate dug wells	None	None	None	Chlorination	$75,000 for .43 mgd	$ 100,000	
Chlorination	State of Massachusetts Public Works Department	Interchange 57 - juction of Rt. 128 and Great Plain Avenue	Would require a major relocation of existing surface structures							
Chlorination, Ammoniation	MDC, Mass. Public Works Department, Private	Cutler Park, Rt 128, industry & private homes	Potentially feasible to reactivate Cutler Park section	None	None	Odor, Taste, Color	Chlorination, Coagulation, Sedimentation, Filtration	$6,800,000 for 8.00 mgd Plant	$7,800,000	
Chlorination, Coagulation, Filtration	Town of Northborough	Not Used	None	None	None	Color, Taste, Odor, Iron	Chlorination, Coagulation, Sedimentation, Filtration	$520,000 for .36 mgd Plant	$ 600,000	
Chlorination, Filtration	Conservation Commission of Westwood. Norwood owns water rights	Park	None	Dedham Water Company	None	Color, Iron, Turbidity, Trichloroethane, Trichloroethyline	Chlorination, Iron Removal, Activated Carbon	$870,000 for 1.50 mgd Plant	$1,000,000	
Aeration, Filtration, pH Adjustment	Town of Norwood	Picnicking	None	Dedham Water Company	None	Color, Iron, Manganese, Trichloroethane, Trichloroethyline	Chlorination, Iron & Manganese Removal, Activated Carbon	$2,165,000 for 2.50 mgd Plant	$2,710,000	
Chlorination	Town of Peabody	Reserve water supply	None	Salem, Beverly, Danvers, Middleton, Hamilton, Topsfield, Ipswich	None	Turbidity, Color, Iron, Manganese	Chlorination, Coagulation, Sedimentation, Filtration	$1,400,000 for 1.2 mgd Plant	$1,530,000	
Iron Removal	Private, Eastman Gelatine Corporation	Industrial Water Supply for Eastman Gelatine Corporation	In use as an Industrial Supply							
None	Private	Industrial Park	Would require a major relocation of existing surface structures							
Filtration	City of Quincy	Industrial Water Supply for General Dynamics in Quincy	In use as an Industrial Supply							

Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Cost of Reactivation	Cost of Water Per Million Gallons	Major Environmental Impacts of Reactivation	Reason if Impractical to Reactivate	Yield of Unfeasible Supplies (mgd)	Yield of Impractical Supplies (mgd)	Yield of Practical Supplies (mgd)
Chlorination, Flocculation, Carbon Addition, Settling, Filtration	$3,750,000 for 2.20 mgd Plant	$7,250,000	$792	High sodium level. Reduce flow of the Assabet River	Excessive Cost		2.20	
Chlorination, Coagulation, Sedimentation, Filtration	$620,000 for .45 mgd Plant	$ 660,000	$552	Reduce flow of the Mystic River	Excessive Cost		.22	
						.28		
						.73		
Chlorination	$75,000 for .43 mgd	$ 100,000	$189	High sodium level. Reduce flow of the Charles River	None			.43
						1.00		
Chlorination, Coagulation, Sedimentation, Filtration	$6,800,000 for 8.00 mgd Plant	$7,800,000	$441	Reduce flow of the Charles River	None			8.00
Chlorination, Coagulation, Sedimentation, Filtration	$520,000 for .36 mgd Plant	$ 600,000	$636	None	Excessive Cost		.18	
Chlorination, Iron Removal, Activated Carbon	$870,000 for 1.50 mgd Plant	$1,000,000	$376	High sodium level. Reduce flow of the Neponset River	None			1.50
Chlorination, Iron & Manganese Removal, Activated Carbon	$2,165,000 for 2.50 mgd Plant	$2,710,000	$511	Reduce flow of the Neponset River	Excessive Cost		2.50	
Chlorination, Coagulation, Sedimentation, Filtration	$1,400,000 for 1.2 mgd Plant	$1,530,000	$511	High sodium level. Reduce flow of the Ipswich River	Excessive Cost		1.20	
						1.80		
						.45		
						1.00		

Community Served	1978 MDC Water Use	Supply Name	Location	Watershed in which Supply is Located	Type of Supply	Description of Supply	Year Developed	Year Removed From Normal Service	Reason for Removal from Normal Service	T Wh
Revere, Winthrop	2,553.80 mg or 7.00 mgd	Revere Water Works	Revere	Pines River	Groundwater	Two (2) dug wells & three (3) groups of tubular wells	1884	1898	Salt water intrusion into wells	
Revere, Winthrop	2,553.80 mg or 7.00 mgd	Crystal Brook Supply	Saugus	Pines River	Groundwater	Sixty-seven (67) tubular wells	1891	1898	Revere joined the MDC	
South Hadley	682.55 mg or 1.87 mgd	Leaping Well Reservoir	South Hadley	Leaping Well Brook - Connecticut River	Surface	Reservoir Surface Area = 9 Acres; Storage = 30 mg.	1892	Reserve Since 1952	Low Yield	Ch
Swampscott, Marblehead, Nahant	1,812.44 mg or 4.97 mgd	Marblehead Water Company	Swampscott	Stacy Brook	Groundwater	Three (3) locations - 1 dug well & 72 tubular wells, 46 tubular wells, 17 tubular wells	From 1885 To 1895	1899	Salt water intrusion into wells	
Wakefield	711.00 mg or 1.95 mgd	Bay State Road Supply	Wakefield	Saugus River	Groundwater	One (1) dug well and eight (8) tubular wells	1927	Tubular wells removed in early 1950's; dug well removed from service about 1975	Poor water quality and low yield	
Wakefield	711.00 mg or 1.95 mgd	Sexton Avenue Supply	Wakefield	Mill River - Saugus River	Groundwater	Ninety-nine (99) tubular wells	From 1930 To 1958	About 1969	Poor water quality	
Waltham	4,221.73 mg or 11.57 mgd	Charles River Wells	Waltham	Charles River	Groundwater	Two (2) dug wells and a filter basin	From 1873 To 1907	1949	Poor water quality	
Watertown, Belmont	2,858.05 mg or 7.83 mgd	Watertown Water Supply Company	Watertown	Charles River	Groundwater	Three (3) filter galleries, a dug well and forty-six (46) tubular wells	From 1885 To 1893	1898	Poor water quality and low yield.	
Wellesley	0 mg	Rosemary Brook Supply	Wellesely	Rosemary Brook - Charles River	Groundwater	A filter gallery, fifty (50) tubular wells & two (2) gravel-packed wells	1884	Reserve Since 1968	Poor water quality	Ch Co Co
Weston	407.38 mg or 1.12 mgd	Warren Avenue Well Field	Weston	Cherry Brook - Charles River	Groundwater	A dug well and eleven (11) tubular wells	From 1896 To 1900	Prior to 1937 but used as a reserve until at least 1949	Poor water quality	Ch
Weston	407.38 mg or 1.12 mgd	Kendal Green Wells	Weston	Stony Brook - Charles River	Groundwater	Thirty (30) tubular wells	From 1910 To 1929	1972	Poor water quality	
Weston	407.38 mg or 1.12 mgd	Fitzgerald & Nickerson Wells	Weston	Seaverns Brook - Charles River	Groundwater	Nickerson - 70' deep by 24" x 12"; Fitzgerald 49' deep by 54" x 24"	Nickerson - 1942 Fitzgerald - 1954	Nickerson on reserve since 1970; Fitzgerald on reserve since 1972	Poor water quality	
Winchester	412.44 mg or 1.13 mgd	Pond Street Wells	Winchester	Aberjona River - Mystic River	Groundwater	Twenty-five (25) tubular wells	From 1938 To 1949	1957	Pumped dry, not reused for fear of reducing yield of another supply	Za ta

Reason for Removal from Normal Service	Treatment While in Use	Present Ownership of Site	Present Use of Site	Reason if Unfeasible to Reactivate	Major Downstream Users Impacted By Reactivation	Known Water Rights Affecting Reactivation	Water Quality Parameters Requiring Treatment	Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Reacti
Salt water intrusion into wells	None	City of Revere	Public Works Department Yard	Would require a major relocation of existing surface structures and desalination						
Revere joined the MDC	None	Private	Residential and Wetlands	Would require a major relocation of existing surface structures						
Low Yield	Chlorination	South Hadley Fire District No. 1	Reserve water supply	None	None	None	Color	Chlorination, Coagulation, Filtration	$680,000 for .60 mgd Plant	$
Salt water intrusion into wells	None	Private	All three (3) sites are developed for residential & commercial purposes	Would require a major relocation of existing surface structures and desalination						
Poor water quality and low yield	None	Town of Wakefield	Not Used	Unfeasible due to present low yield						
Poor water quality	None	Town of Wakefield	Salt and sand storage	Area has been contaminated with road deicing chemicals						
Poor water quality	None	City of Waltham	Not Used	Potentially feasible to reactivate one of dug wells	None	None	Color, Iron, Manganese	Chlorination, Iron Removal	$3,000,000 for 3.00 mgd Plant	$3
Poor water quality and low yield.	None	MDC & Private	Small park, commercial & industrial	Would require a major relocation of existing surface structures						
Poor water quality	Chlorination, Corrosion Control	Town of Wellesley	Reserve water supply	None	None	None	None, but sanitary sewer is located within 400 feet of wells	Chlorination, Coagulation, Sedimentation, Filtration	$2,100,000 for 2.00 mgd Plant	$2
Poor water quality	Chlorination	Town of Weston	Wetland	Unfeasible to locate and seal old wells in order to prevent pollution of aquifer						
Poor water quality	None	Town of Weston	Wetland	Solid waste disposal site nearby						
Poor water quality	None	Town of Weston	Reserve water supply	Unfeasible as long as existing road de-icing practices continue in area						
Pumped dry, not reused for fear of reducing yield of another supply	Zeolite Filters	Town of Winchester	Department of Public Works Storage	Would require a major relocation of existing structures and reduce the yield of another supply						

ıt for ion	Cost of Treatment Facilities	Total Cost of Reactivation	Cost of Water Per Million Gallons	Major Environmental Impacts of Reactivation	Reason if Impractical to Reactivate	Yield of Unfeasible Supplies (mgd)	Yield of Impractical Supplies (mgd)	Yield of Practical Supplies (mgd)
						.30		
						.60		
tion, ion, on	$680,000 for .60 mgd Plant	$ 700,000	$487	None	Excessive Cost		.28	
						.84		
						.13		
						.24		
tion, oval	$3,000,000 for 3.00 mgd Plant	$3,300,000	$466	Reduce flow of the Charles River	None			2.50-3.00
						.51		
tion, ion, tation, on	$2,100,000 for 2.00 mgd Plant	$2,250,000	$466	High sodium level. Reduce flow of the Charles River	None			2.00
						.10-.30		
						.72		
						2.38		
						.30-.50		

Community Served	1978 MDC Water Use	Supply Name	Location	Watershed in which Supply is Located	Type of Supply	Description of Supply	Year Developed	Year Removed From Normal Service	Reason for Removal from Normal Service	Treatment While in Us
Framingham	3,080.40 mg or 8.44 mgd	Lake Cochituate Wells	Framingham	Sudbury River	Groundwater	Three (3) 8" Diameter gravel-packed wells	1939	After 1966 used in summer only	Poor water quality	Chlorinatio
		Upper Sudbury River Supply	Southborough, Marlborough	Upper Sudbury River	Surface	Reservoir; Surface Area = 1,292 Acres; Storage = 7,253 mg.	1896	1951 Now a Reserve	Poor water quality	Chlorinatio
		Lower Sudbury River Supply	Framingham, Ashland, Hopkinton	Lower Sudbury River	Surface	Six (6) Reservoirs; Combined Surface Area = 1,500 Acres; Storage = 6,268 mg.	From 1875 To 1895	1946 Framingham Reservoirs Nos. 1, 2, & 3 are still reserve	Poor water quality	Chlorinatio
Totals										

e	Treatment While in Use	Present Ownership of Site	Present Use of Site	Reason if Unfeasible to Reactivate	Major Downstream Users Impacted By Reactivation	Known Water Rights Affecting Reactivation	Water Quality Parameters Requiring Treatment	Treatment Necessary for Reactivation	Cost of Treatment Facilities	Total Cost of Reactivation	of Mill
a-	Chlorination	Town of Framingham	Reserve water supply	None	Billerica, Andover, Lawrence, Methuen, Wayland, Sudbury, Concord	None	Manganese	Chlorination, Manganese Removal	$3,000,000 for 3.00 mgd Plant	$3,100,000	
a-	Chlorination	MDC	Reserve water supply	None	Billerica, Andover, Lawrence, Methuen, Framingham, Wayland, Sudbury, Concord	None	Color, Turbidity	Coagulation, Flocculation, Sedimentation, Filtration	$11,150,000 for 30 mgd Plant	$11,800,000	
a-	Chlorination	Three (3) Reservoirs MDC; Three (3) Reservoirs Massachusetts Department of Environmental Management	Three (3) Reservoirs reserve water supply; Three (3) Reservoirs boating and swimming	None	Billerica, Andover, Lawrence, Methuen, Framingham, Wayland, Sudbury, Concord	Minimum of 1.5 mgd must be released at Dam No. 1 in Framingham	Color, Turbidity	Coagulation, Flocculation, Sedimentation, Filtration	$29,700,000 for 75 mgd Plant	$69,800,000	
										$138,315,000 ($55,050,000 for practical supplies; $83,265,000 for impractical supplies)	

Cost of Treatment Facilities	Total Cost of Reactivation	Cost of Water Per Million Gallons	Major Environmental Impacts of Reactivation	Reason if Impractical to Reactivate	Yield of Unfeasible Supplies (mgd)	Yield of Impractical Supplies (mgd)	Yield of Practical Supplies (mgd)
$3,000,000 for 1.00 mgd Plant	$3,100,000	$433	Reduce flow of the Sudbury and Concord Rivers	None			3.00
$11,150,000 for 10 mgd Plant	$11,800,000	$303	Reduce flow of the Sudbury and Concord Rivers	None			21.90
$29,700,000 for 5 mgd Plant	$69,800,000	$605	Reduce flow of the Sudbury and Concord Rivers	Excessive Cost		34.50	
	$138,315,000 ($55,050,000 for practical supplies; $83,265,000 for impractical supplies)				33.26-33.76	44.68	52.36-52.86

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Mr. Waldo Holcombe of the Neponset Conservation Association.

Respectfully submitted,

Charles E. Cannon

Charles E. Cannon
Vice President

APPENDIX A

UPPER AND LOWER SUDBURY RIVER SUPPLIES

The Upper and Lower Sudbury River Supplies are both located in the Upper Sudbury River Watershed. The Upper Sudbury River Watershed consists of the entire drainage area of the Sudbury River upstream of Dam No. 1 in Framingham. The total area of this watershed is 75.2 square miles and it contains seven major reservoirs. These reservoirs are the Sudbury Reservoir, Framingham Reservoir No. 1, Framingham Reservoir No. 2, Framingham Reservoir No. 3, the Ashland Reservoir, the Hopkinton Reservoir, and the Whitehall Reservoir.

These reservoirs were developed as a water supply by the City of Boston beginning in 1875 and were completed in 1896. They were then used as a major source of supply by the Metropolitan District Commission until 1946. In 1946, use of the Whitehall, Ashland, Hopkinton, Framingham No. 1 and Framingham No. 2 Reservoirs was discontinued and in 1947 the Whitehall, Ashland and Hopkinton Reservoirs were transfered to recreational uses. Framingham Reservoir No. 3 continued in use until 1950 and the Sudbury Reservoir was used until 1951. After 1951, the Sudbury Reservoir and Framingham Reservoir No. 3 were used as a summer peaking supply except in 1966 and 1967 when both were used heavily due to drought. After 1974, the two reservoirs were no longer used but they still remain as reserve supplies.

In recent years the possibility of reactivating the Upper Sudbury River Watershed as a major source of supply has been under consideration and an assessment of this possibility was made. In 1975, a report entitled, A Study of the Upper Sudbury River Watershed was prepared by CE Maguire, Inc., of Waltham, Massachusetts. This report suggested four possible options regarding the future use of the area.

The first option, called Allocation Plan A, was to continue, with some minor modifications, the past practice of bleeding 5 to 10 mgd into the MDC distribution system during the summer months. Under this option, a half of a 25 mgd water treatment module which would provide treatment through coagulation, sedimentation and filtration was proposed. This utilization would provide an average of 10 mgd for 90 days per year and provide a total of 900 mg in an average year. This option would involve taking water only from the Sudbury Reservoir which has a drainage area of 22.3 square miles.

The second option, Allocation Plan B, proposed the utilization of water from the entire Upper Sudbury River Watershed. To accomplish this, a 200 mgd pumping station would be built at Framingham Reservoir No. 1 to pump water flowing from the south branch of the watershed and water from Framingham Reservoir No. 3 back up to the Sudbury Reservoir where treatment facilities would be located. Four, 25 mgd treatment modules would treat the water for introduction into the Weston Aqueduct. The method of treatment would be the same as that recommended under Allocation Plan A.

In an average year, this plan would provide 10,714 mg of water or 29.35 mgd. This plan was the option recommended in the report.

The third option, Allocation Plan C, proposed to utilize the entire Upper Sudbury River Watershed to an even greater degree than Allocation Plan B. Under this option, a 250 mgd pumping station at Framingham Reservoir No. 1 would be needed as well as five, 25 mgd water treatment modules at the Sudbury Reservoir. Treatment would be the same as in Allocation Plans A and B. Under this plan, the yield would be increased to 16,362 mg or 44.83 mgd in an average year. Due to the increased amount of water removed however, the possibility of adverse impacts due to low flow downstream was increased and, therefore, the construction of an elevation control structure on the Concord River at Talbot Dam in North Billerica was recommended.

The fourth option considered in the report, Allocation Plan D, proposed the abandonment of the entire Upper Sudbury River Watershed as a water supply. Under this plan, the Sudbury Reservoir would be developed for recreation through the creation of a swimming beach and the development of camping areas, picnicking areas, bike paths and a boat landing.

In 1979, an amendment to A Study of the Upper Sudbury River Watershed was completed by CE Maguire, Inc. This study explored an alternative which was not considered in the 1975 report. This option, called Allocation Plan E, recommended the use of the Sudbury Reservoir alone. Under this plan, a 30 mgd water treatment plant would be built. Treatment would consist of coagulation, flocculation, sedimentation and filtration and the water would flow by gravity

into the Weston Aqueduct. This plan would produce 8,000 mg of water in an average year or about 21.90 mgd. At the time of this writing, this plan is the option with which the MDC intends to proceed. In the 1979 report, a cost estimate was given for Allocation Plan E and the cost estimates made in 1975 for Allocation Plans A, B, C and D were updated. This data is presented in Table A-1.

For the purpose of this report, the Upper Sudbury River Watershed is considered in two parts. These parts are the Upper Sudbury River Supply and the Lower Sudbury River Supply. The Upper Sudbury River Supply contains the Sudbury Reservoir and the 22.3 square miles which drain into it. This is identical to the area considered in Allocation Plan E in the 1979 report by CE Maguire, Inc.

The Lower Sudbury River Supply consists of the remainder of the Upper Sudbury River Watershed and the six reservoirs within it; Framingham Reservoir Nos. 1, 2 and 3 and the Hopkinton, Ashland and Whitehall Reservoirs. This supply has a total drainage area of 52.9 square miles. The Lower Sudbury River Supply comprises the entire area of the Upper Sudbury River Watershed not considered in Allocation Plan E.

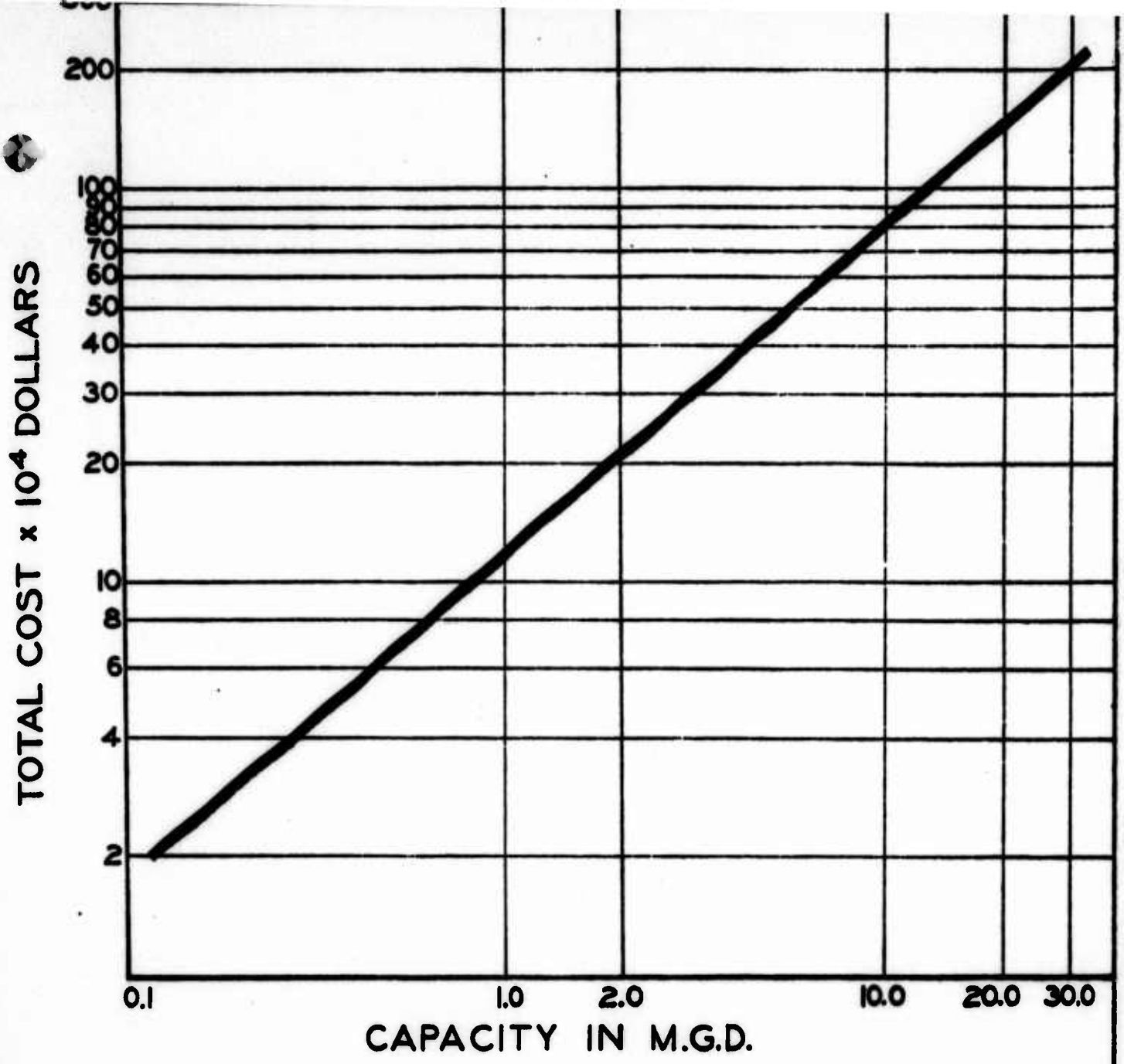
Data on treatment costs and total reactivation costs for both the Upper Sudbury River Supply and the Lower Sudbury River Supply are based on costs given in the 1979 report by CE Maguire, Inc. The costs for the Upper Sudbury River Supply are updated versions of the costs presented for Allocation Plan E. The costs for the Lower Sudbury River Supply are based upon costs presented

Table A-1

Comparative 1979 cost estimates of five different Allocation Plans for the use of the Sudbury River Supply. Data from an amendment to A Study of the Upper Sudbury River Watershed by CE Maguire, Inc., Waltham, Massachusetts.

Allocation Plan	Capital Cost	Annual Cost	Cost of Water
Plan A	$ 4,686,391	$ 485,676	$540/mg
Plan B	$69,094,510	$6,249,486	$583/mg
Plan C	$74,204,932	$7,943,589	$485/mg
Plan D	$ 2,298,543	$ 685,239	Annual Revenue $89,120
Plan E	$ 9,901,562	$1,757,940	$220/mg

for treatment facilities proposed for Allocation Plans B and C. The capacity of the treatment plant was reduced to 75 mgd and the capacity of the pumping station was reduced to 150 mgd and costs were adjusted to reflect these changes. All costs were then updated to reflect expected costs on about September 1, 1980. The cost of water per million gallons was calculated in the manner described in the Introduction to this study in the section entitled, "Cost Determination".



Includes: Special sitework, contractor overhead and profit, engineering and construction, fiscal, and administrative. Land and legal costs not included.

APPENDIX B
Water Treatment Construction Costs
vs.
Treatment Plant Capacity

Coffin & Richardson, Inc.
Consulting Engineers
Boston, Mass.

ABANDONED OR RESERVE
WATER SUPPLIES

Department of the Army
New England Division, Corps of Engineers
Waltham, Mass.

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